ATLANTIC PROVINCES

VEGETABLE CROPS

GUIDE TO PEST MANAGEMENT

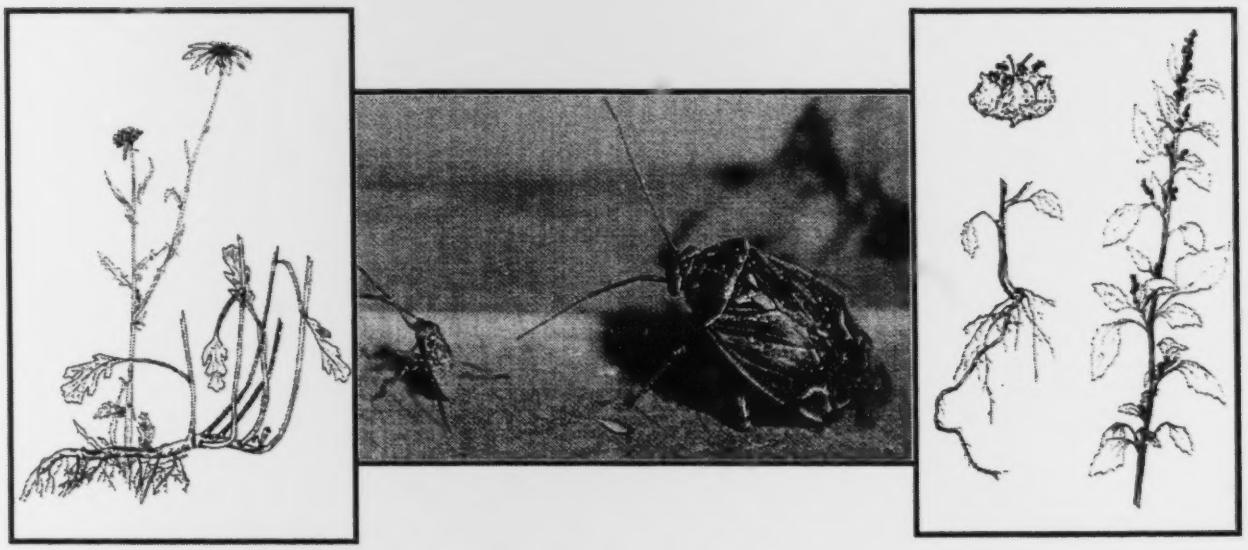
1999-2000

Compliments of:
Agriculture Resources Team
PEI Dept. Of Agriculture & Forestry
1-800-959-8929
www.gov.pe.ca/af/agweb

Publication No. 1400A
Agdex No. 250

Prepared by the
ATLANTIC VEGETABLE COMMITTEE

Published by authority of the
ATLANTIC PROVINCES AGRICULTURAL SERVICES CO-ORDINATING COMMITTEE



For additional information regarding vegetable crop production, refer to A.P.A.S.C.C. Factsheet Series #1400 Vegetable Production Guides for the Atlantic Provinces.

Atlantic Provinces Vegetable Crops Guide to Pest Management

This publication was compiled by the Atlantic Committee on Vegetables using information from the Pest Management Regulatory Agency of Health Canada, specific pesticide labels and manufacturers information. This information is continuously changing and therefore it can cease to be current and accurate. Pesticide labels are the best source of information .

By printing this publication, the provinces of Nova Scotia, New Brunswick, Newfoundland and Prince Edward Island do not offer any warranty or guarantee, nor do they assume any liability for any crop loss, animal loss, health, safety or environmental hazard caused by the use of a pesticide mentioned in this publication.

Warnings

Before using any pesticide, always study the label. It is the best source of information on its use: for registered crop uses, rates, days to harvest, compatibility with other pesticides, toxicity and other special information on its effective and safe use.

If any information in this or any other publication conflicts with the information on the label, always use the label recommendation. If you have an old label, your pesticide supplier should be able to give you the newest label.

You are legally responsible for the safe use of pesticides you purchase. This means the safe transport and storage of these materials, the label rates used on crops, and the safe disposal of containers.

Environmental Emergencies

Oil, pesticide and chemical spills, fish kills, defective aids to navigation and other environmental emergencies

New Brunswick, Nova Scotia and Prince Edward Island: 1-800-565-1633 (toll-free)

Newfoundland and Labrador: 1-800-563-2444 (toll-free)

Poison Control Centres

Nova Scotia	Call **911** or the Poison Control Centre at the IWK-Grace Hospital: **902-428-8161 or 1-800-565-8161**
Prince Edward Island	Call the Poison Control Centre at the IWK-Grace Hospital: **902-428-8161 or 1-800-565-8161**
Newfoundland & Labrador	Call the Poison Information Centre at the Dr. Charles A. Janeway Child Health Care Centre, St. John's: **709-722-1110**
New Brunswick	Call **911** (the poison control information centre is located in Moncton)

Foreward

This publication has been written and compiled by pest management specialists (see back cover) in the four Atlantic provinces under the authority of the Atlantic Committee on Vegetables with its editorial committee as follows:

Charles Thompson	Vegetable Specialist, N.S. Department of Agriculture and Marketing Kentville Agricultural Centre, Kentville, NS B4N 1J5
Susan MacKinnon	Vegetable Specialist, P.E.I Department of Agriculture and Forestry PO Box 1600, Charlottetown, PEI C1A 7N3
Andrew Currie	Vegetable Specialist, N.B. Department of Agriculture and Rural Development P.O. Box 6000, Fredericton, N.B. E3B 5H1
Mike Stapleton	Crops Specialist, Newfoundland Department of Forest Resources & Agrifoods P.O. Box 8700, St. John's NF A1B 4J6

Pesticides General - In this publication most recommendations list several pesticides that are effective for each insect, disease or weed. This publication was revised in February, 1999 so registrations since that time are not included. Not all chemicals registered on a certain crop are contained in this publication but only the most effective on the particular pests are listed.

The effectiveness of pesticides, and plant injury by pesticides, are influenced by the weather and other conditions. Consult the label regarding compatibility with other materials, the effect of high or low temperatures, poor drying conditions, etc. Wettable or soluble powder (WP or SP) preparations generally are less likely to cause plant injury than liquid concentrate (EC, Sn and F) formulations.

Brand or trade names of chemicals are used for the convenience of readers. This constitutes neither an endorsement of the product nor a suggestion that similar products are not effective.

The pesticide rates stated in the recommendations are for each hectare actually covered unless otherwise stated. The amount of water used per hectare may vary depending on the pest to be controlled and type of equipment.

For advice related to pests, spray mixtures, spraying and timing of applications, consult the vegetable crop advisor serving your area.

Pesticide Resistance - Some of the pesticides recommended in this guide have very specific modes of action. *They should not be used continuously and repeatedly in a season-long program* since this increases the risk of the development of pest resistance. Examples of these types of pesticides are: Benlate, Rovral, Lannate, the pyrethroids (Ambush, Belmark, Pounce) and certain herbicides such as Atrazine, Bladex, Princep and Gesagard. They should be *used in rotation with other pesticides or alternated with other pesticides* so that the likelihood of resistance development is reduced.

April, 1999

Contents

Information on each of these crops includes:
(1) Herbicides (2) Insecticides and (3) Fungicides

CROP

Asparagus 1
Beans (Dry) 4
Beans (Snap) 7
Beets 9
Carrots 11
Celery 14
Chinese Vegetables 16
Cole Crops 17
Corn 23
Cucumber 26
Garlic 29
Ginseng 30
Leeks 32
Lettuce 33
Onions 36
Parsnip 39
Peas 40
Peppers 42
Pumpkins & Squash 44
Radish 46
Rhubarb 47
Spinach 48
Tomatoes 50
Turnips & Rutabagas 54

APPENDICES

I Seed Treatment 58
II Damping Off 58
III Control of Wireworms, White Grubs, Cutworms and Slugs 59
IV Weed Control Table for Herbicides Used on Vegetable Crops 61
V Pesticides: Names, Classification, Toxicity 63
VI Fungicides Registered for Use on Vegetables 66
VII Insecticides Registered for Use on Vegetables 68
VIII Spray Adjuvants 71
IX Vertebrate Pest Control 72
X Disinfectants for Vegetable Growers 73
XI Pesticide Safety 74

ASPARAGUS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Postemergence Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Before Emergence of Direct-Seeded Asparagus Germinating annuals	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha	-	Use "stale seedbed technique". Apply in 300 to 1100 L water/ha to foliage of emerged weeds but before the crop has emerged. Gramoxone is more effective on grasses.
	REGLONE 200 SN	2.75 to 5.5 L/ha		
	IGNITE 15 Sn	2.7 to 5.0 L/ha		Ignite should be applied in 110 - 330 L of water/ha.
	DEVRINOL 50 DF	4.5 to 9 kg/ha	6	Devrinol does not control established weeds and should not be used more than once per year. Can be tank mixed with Gramoxone.
	SINBAR 80 WP	0.375 kg/ha	5	Apply within 2 days after planting. Do not use on gravelly soils. Do not tank mix with Fusilade or injury will occur.
Postemergence Grasses	FUSILADE II 125 EC	0.6 to 2.0 L/ha	-	Apply low rate to annual grasses at the 2 to 5 leaf stage. Apply 2 L/ha to quackgrass at the 3 to 5 leaf stage.
1st Year Crown-Establishment Germinating annuals and quackgrass	DEVRINOL 50 DF	4.5 to 9.0 kg/ ha	6	Apply to crop, preemergence to the weeds.
Postemergence	FUSILADE II 125 EC	0.6 to 2.0 L/ha	-	Apply low rate to annual grasses at the 2 to 5 leaf stage. Apply 2 L/ha to quackgrass at the 3 to 5 leaf stage.

ASPARAGUS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
2nd Year and Established Asparagus Germinating weeds	KARMEX 80 DF	2.1 to 2.7 kg/ha	-	Disk before shoots emerge in spring on established plantings. This may be followed by the application of one of these listed products. Rain or irrigation will enhance control. A second application can be made after the post harvest disking. **CAUTIONS**: The lower rates should be used on sandy soils. If rotations are planned, these herbicides may carry-over and injure subsequent sensitive crops.
	LINURON:			
	LOROX 50 DF	3.3 to 4.3 kg/ha		
	LOROX L 480 Su	3.6 to 4.7 L/ha		
	FOLAN F 480 Su	3.5 to 4.7 L/ha		
	METRIBUZIN:			
	SENCOR 500 F Su	2.25 to 4.5 L/ha	14	
	SENCOR 75 DF	1.5 to 3.0 kg/ha	14	
	SIMAZINE:			Apply preemergence to established beds. Make only one application per season.
	PRINCEP-NINE-T	2.5 to 3.75 kg/ha	7	
	SIMADEX	4.5 to 6.7 L/ha	7	
	PRINCEP-NINE-T plus DEVRINOL 50 W	1.2 to 2.4 kg/ha 9.0 to 13.4 kg/ha	7	
Germinating annual grasses, lambsquarters and pigweed	TRIFLURALIN:			Apply after the last cutting of spears (post harvest disking) and incorporate as indicated on the label. Use only on established plantings of 3 years or more.
	TREFLAN 480 EC	2.0 to 4.2 L/ha	-	
	RIVAL 60 DF	1.7 to 3.3 kg/ha		
	BONANZA 400	2.5 to 5.0 L/ha		
Emergence or After Last Cutting Annual Weeds	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha	-	Apply in 300 to 1100 L water/ha to emerged weeds, but before crop emerges or after the last cutting. Use high volume on heavy weed infestations. Does not give residual control and is not effective on perennial weeds.
	TERRAKLENE Su	4.2 to 8.5 L/ha	-	A commercial mixture of paraquat and simazine combining the 'knock down' of GRAMOXONE with the residual activity of PRINCEP. A second application can be made after harvest. Recommended only on established plantings. Higher rates should be used on heavy soils, high in organic matter.
Postemergence emerged annual grasses	EXCEL Super	0.67 L/ha	-	Apply to asparagus only after the spears have been harvested. Apply when the annual grasses are in the 1 to 6 leaf stage. Grasses emerging after application will not be controlled.
	FUSILADE II 125 EC	0.6 to 2.0 L/ha	-	Apply low rate to annual grasses at the 2 to 5 leaf stage. Apply 1 to 2 L/ha to quackgrass at the 3 to 5 leaf stage.

ASPARAGUS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Immediately After Harvest is complete Annual and some perennial broadleaf weeds	2,4-D AMINE Sn 500	2.2 to 3.5 L/ha	-	Apply before, during or at the end of the harvest season when broadleaf weeds are actively growing. During harvest spray immediately after cutting to minimize crop injury. After harvest, use drop nozzles to avoid spraying ferns.
After Last Cutting Perennial Weeds	2,4-D AMINE Sn 500	2.2 to 3.5 L/ha	-	Apply as directed postemergence spray in 50 to 100 L water/ha three weeks after last disking.
Insects				
Asparagus aphid	DIMETHOATE 480 EC	2.3 L in 675 L of water/ha	-	Apply only as necessary in 3 to 4 week intervals.
	PIRIMOR 50 WP	1 kg in 675 L of water/ha		Apply at 3 to 4 week intervals. For mature asparagus after harvest.
	PIRIMOR 50 DF	1 kg in 675 L of water/ha		
Asparagus beetle	METHOXYCHLOR 50 WP	1.7 to 4.3 kg/ha	3	Spray when adult beetles are seen and before egg laying begins in spring. Obtain thorough coverage.
	MALATHION 500 EC	2.5 L/ha	1	
	MALATHION 25 WP	5.5 kg/ha	1	
	CYMBUSH 250 EC	140 mL/ha	1	
	SEVIN XLR Plus	2.5 to 6.4 L/ha	2	Use only during harvest, not during fern growth period.
	DECIS 2.5 EC	400 mL/ha	-	Apply postharvest only.
	DECIS 500 EC	200 ml/ha	-	
Diseases				
Rust	ZINEB 80 WP	1.1 to 3.3 kg/ha	-	Start spraying new, non-harvested plantings as soon as growth is about 30 cm high. For harvested plantings, begin as soon as fern growth commences after harvest is complete. Spray at 7 - 10 day intervals. Do not apply to spears to be cut.
	POLYRAM 80 DF	2.25 to 3.25 kg/ha	-	
Fusarium root & crown rots	BENLATE 50 WP	2.0 g/L	-	Dip 3000 crowns in 100 L solution for 15-20 minutes prior to planting. Ensure seed is treated with sodium hypochlorite prior to planting. Do not plant within 3 years of corn.

BEANS (Dry)

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 3 to 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Treatments Germinating annual grasses and some broadleaf weeds	EPTAM 800 EC	4.25 to 5.5. L/ha	-	Must be applied to a dry clod-free soil surface and incorporated within 10 minutes. Use in conjunction with preemergence or postemergence herbicide for control of broadleaf weeds.
	TRIFLURALIN:			Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year. Use in conjunction with pre-emergence or postemergence herbicide for control of broadleaf weeds.
	TREFLAN 480 EC	1.2 to 2.3 L/ha	-	
	RIVAL 60 DF	1.0 to 1.9 kg/ha	-	
	BONANZA 400 EC	1.5 to 2.75 L/ha		
	DUAL II MAGNUM	1.15 to 1.75 L/ha	-	Do not use on very sandy soils, or on soils high in organic matter. Use in conjunction with pre-emergence or postemergence herbicide for control of broadleaf weeds. DUAL II MAGNUM can be used in white, kidney and pinto beans.
	EDGE 60 DC	1.1 to 1.9 kg/ha	-	Incorporate within 24 hours of application. Use in conjunction with a preemergence or postemergence herbicide for control of broadleaf weeds.
Preemergence Treatments Broadleaf weeds and annual grasses	AFESIN 200 EC	5.5 to 7.0 L/ha	-	Do not use on coarse sandy soil with less than 3% organic matter. Shallowly planted crops may be injured if heavy rains follow application. Some control of annual grasses may be obtained.
	DINOSEB PTK 300 EC	20.4 to 26.4 L/ha	-	For use on white bean only. Apply preemergence to crops and weeds. Do not use on very light soils, low in organic matter. Apply soon after planting in 250 to 400 L of water/ha. Check label for weeds controlled. **Dinoseb is not registered for use in New Brunswick.**
	PATORAN FL 400 SU	2.8 to 3.4 L/ha	-	Do not exceed the low rate on kidney beans. Use the lower rate on sandy soils but do not use on soils with less than 2% organic matter. Shallowly planted crops may be injured if heavy rains follow application. Partial grass control may be obtained.
	PATORAN 50 WP	2.25 to 2.75 kg/ha	-	

BEANS (Dry) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Grasses (Annual)	FRONTIER	1.4 L/ha	-	Apply only to white and kidney beans. Incorporation by rainfall or irrigation after application, is most effective.
Annual grasses and broadleaf weeds	PURSUIT	0.31 L/ha	-	Apply one application per year to white or kidney beans only. Rotational cropping restrictions apply.
Postemergence Treatments Broadleaf Weeds	BASAGRAN 480 Sn plus ASSIST oil conc.	1.75 to 2.25 L/ha plus 1 to 2 L/ha	-	Apply in 200 to 400 L water per hectare when beans are in the unifoliate to 4th trifoliate leaf stage and weeds are growing actively. Split applications may be necessary for Canada thistle control. Not residual.
	BASAGRAN FORTE	1.75 to 2.25 L/ha	-	Premix (No adjuvant needed).
Annual grasses	HOE-GRASS 284 EC	3.5 L/ha	-	Apply when annual grasses are in 1 to 4 leaf stage. Controls volunteer corn but not volunteer cereals, quackgrass or crabgrass. Do no tank mix with other herbicides.
	POAST 184 EC plus ASSIST oil conc. or MERGE	0.8 to 1.6 L/ha 2 L/ha 1 L/ha	80	Treat at the 1 to 6 leaf stage of annual grasses. Use the higher rate for control of volunteer cereals. Apply in 50 to 200 L/ha water.
	EXCEL SUPER 80.5	0.67 L/ha	60	Apply when annual grasses are in the 1 to 6 leaf stage and are actively growing. Excel can be tank mixed with Basagran for control of several broadleaf weeds. Use a minimum of 200 L of water per ha with the mixture.
Annual grasses and broadleaf weeds	EXCEL SUPER 80.5 plus BASAGRAN plus ASSIST oil conc.	0.67 L/ha 1.75 to 2.25 L/ha 2.0 L/ha	60	Add Basagran followed by Excel Super followed by Assist to a tank one-half full of water then complete filling. Do not use excessive agitation. Temporary crop injury possible during hot, humid conditions - when these conditions occur reduce oil concentrate (ASSIST) to 1 L/ha.
Emerged Quackgrass	POAST 184 Sn plus ASSIST oil conc. or MERGE	1.60 L/ha 4 L/ha 2 L/ha	80	Apply at the 1 to 3 leaf stage of actively growing quackgrass in 110 to 200 L/ha water.
Harvest-Aid to burn off weeds	REGLONE plus AGRAL 90	2 to 2.75 L/ha 1 L/1000 L	80	Apply Reglone and Reglone Pro when 80% of pods have turned yellow. Do not apply Ignite to dry beans grown for seed. Apply Ignite when 50 tp 75% of the pods are yellow-brown. Apply Roundup or Roundup Fastforward Preharvest, 7 to 14 days before harvest, when grain moisture is less than 30%.
	REGLONE PRO IGNITE 15 Sn ROUNDUP L ROUNDUP FASTFOR-WARD PREHARVEST	1.5 to 2.0 L/ha 2.5 to 3.0 L/ha 2.5 L/ha 3.0 L/ha		

BEANS (Dry) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Insects				
Seedcorn maggot				See "Seed Treatment"
Twospotted spider mite	CYGON 480 EC	0.7 to 1.0 L/ha	7	Most serious in dry years. Do not graze or feed crop refuse to livestock.
	DIMETHOATE 480 EC	0.7 to 1.0 L/ha	7	
	LAGON 480 EC	0.7 to 1.0 L/ha	7	
	KELTHANE 35 WP	1.1 to 1.75 kg/ha	7	Use low rate for small plants. Use high rate for larger plants.
European corn borer	GUTHION 50 WP	1.1 kg/ha	3	An occasional pest. Control requires carefully timed repeated applications. Apply in sufficient water to give complete coverage.
	APM 50 WP	1.1 kg/ha	3	
Diseases				
Sclerotinia white mold	BENLATE 50 WP	1.75 to 2.25 kg/ha	14	Where white mold has been a serious problem in the past, apply Benlate 50 WP 1.75 kg/ha or Easout 50 WP 1.75 kg/ha or Senator 70 WP 1.75 kg/ha when 20-30% of the plants have one open blossom followed by Rovral 50 WP 1.0 kg/ha or Ronilan 50 EG 1.0 kg/ha, 5 days later. In fields without a history of severe disease, apply Benlate 50 WP 1.75 kg/ha or Easout 50 WP 1.75 kg/ha or Senator 70 WP 1.75 kg/ha or Rovral 50 WP 1.5 kg/ha or Ronilan 50 EG 1.5 kg/ha when 70-80% of the plants first have one open blossom. Effective control can only be achieved by using drop nozzles and high pressure so that spray contacts blossoms. When conditions are dry before and during bloom no fungicide is required.
	EASOUT 70 WP	1.75 to 2.25 kg/ha	14	
	SENATOR 70 WP	1.75 to 2.25 kg/ha	14	
	ROVRAL 50 WP	1.0 to 1.5 kg/ha	not after bloom	
	RONILAN 50 EG	1.0 to 1.5 kg/ha	45	
Bacterial Blights	FIXED COPPER	Manufacturer's Directions	1	At the first sign of disease and at 7 day intervals.
Harvest Aid desiccant	ROUNDUP 356 Sn	2.5 L/ha	-	Apply in 50 to 100 L/ha of water when the crop is 30% grain moisture or less. Apply at least 7 days before harvest. Do not apply to seed crops.
	REGLONE 200 Sn plus AGRAL 90	2.10 to 2.75 L/ha 1 L per 1000 L of spray solution	-	This treatment burns off weeds to aid harvest.

BEANS (Snap)

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Treatments Germinating annual grasses and some broadleaf weeds	EPTAM 800 EC	4.25 to 5.5. L/ha	-	Must be applied to a dry clod-free soil surface and incorporated within 10 minutes. Use in conjunction with preemergence or postemergence herbicide for control of broadleaf weeds.
	TREFLAN 480 EC	1.2 to 2.3 L/ha	-	Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year. Use in conjunction with pre-emergence or postemergence herbicides for control of broadleaf weeds.
	RIVAL 60 DF	1.0 to 1.9 kg/ha	-	
	DUAL II MAGNUM	1.15 to 1.75 L/ha	-	Do not use on very sandy soils or those high in organic matter. Use in conjunction with pre- and postemergence herbicide for broadleaf weed control.
Preemergence Treatments Germinating annual broadleaf weeds and grasses	DINOSEB PTK 300 EC	20.4 to 26.4 L/ha	-	Apply soon after planting, but before crop emergence. Do not use on very light soils, low in organic matter. Poor control of mallow, chickweed and mayweed. **Not registered for use in New Brunswick.**
Germinating broadleaf weeds	AFESIN 200 EC	5.5 to 7.0 L/ha	-	Do not use on coarse sandy soil with less than 3% organic matter. Shallowly planted crops may be injured if heavy rains follow application. Partial grass control.
	PATORAN FL 400 SU	2.8 to 3.44 L/ha	-	Do not exceed the low rate on snapbeans. Use the lower rate on sandy soils with less than 2% organic matter. Shallowly planted crops may be injured if heavy rains follow application. Partial grass control.
	PATORAN 50 WP	2.25 to 2.75 kg/ha		
Postemergence Treatments Broadleaf Weeds	BASAGRAN 480 Sn plus ASSIST oil conc.	1.75 to 2.25 L/ha plus 2 L/ha	-	Apply in 200 to 400 L water per hectare when beans are in the unifoliate to 4th trifoliate leaf stage and weeds are growing actively. Split applications may be necessary for Canada thistle control. Not residual.
Emerged Quackgrass	POAST 184 Sn plus MERGE or ASSIST	1.6 L/ha 2 L/ha	80	Apply at 1 to 3 leaf stage of actively growing quackgrass in 110 to 220 L of water/ha.

BEANS (Snap) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Annual grasses	HOE-GRASS 284 EC	3.5 L/ha	-	Apply when annual grasses are in 1 to 4 leaf stage. Controls volunteer corn but not volunteer cereals, quackgrass or crabgrass. Do no tank mix with other herbicides.
	POAST 184 EC plus ASSIST or MERGE	0.8 to 1.6 L/ha 1 L/ha	60	Treat at 1 to 6 leaf stage of annual grasses. Use higher rate on volunteer cereals.
Insects				
Seedcorn maggot				See "Seed Treatment"
Twospotted spider mite	CYGON 480 EC	0.7 to 1.0 L/ha	7	Most serious in dry years. Do not graze or feed crop refuse to livestock.
	DIMETHOATE 480EC	0.7 to 1.0 L/ha	7	
	LAGON 480 EC	0.7 to 1.0 L/ha	7	
	KELTHANE 35 WP	1.1 to 1.75 kg/ha	7	Use low rate for small plants. Use high rate for larger plants.
European corn borer	SEVIN 50 WP	4.5 kg/ha	3	An occasional pest. Control requires carefully timed repeated applications. Apply in sufficient water to give complete coverage. Monitor moths using pheromone traps.
	SEVIN 85 WP	2.65 kg/ha	3	
	SEVIN XLR Plus	5.25 L/ha	5	
	GUTHION 240 SC	2.25 L/ha	3	
	LANNATE L	2.3 L/ha	7	Worker re-entry period 24 hours.
Diseases				
Pythium and *Phytophthora* root rot	RIDOMIL 240 EC	1.2 L/ha	at planting	Apply at the rate of 9.2 ml of product/100 m of row based on a 20 cm spray band and 76 cm row spacing. This is equivalent to 1.2 L per treated hectare. See label for further details.
Sclerotinia white mold *Botrytis* pod rot	BENLATE 50 WP	1.75 to 2.25 kg/ha	14	Where white mold has been a serious problem in the past, apply Benlate 50 WP 1.75 kg/ha when 20-30% of the plants have one open blossom followed by Rovral 50 WP 1.5 kg/ha, 5 days later. In fields without a history of severe disease, apply Benlate 50 WP, 1.75 kg/ha or Rovral 50 WP 1.5 kg/ha when 70-80% of the plants first have one open blossom. Effective control can only be achieved by using drop nozzles and high pressure so that spray contacts blossoms. Apply Ronilan at early bloom and a second application 7 days later at full bloom. Use higher rate under extremely favourable disease conditions. When conditions are dry before and during bloom no fungicide is required.
	ROVRAL 50 WP	1.5 kg/ha	not after bloom	
	RONILAN 50 DF	1.0 to 1.5 kg/ha	20	
	RONILAN 50 EG	1.0 to 1.5 kg/ha	14	

BEETS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Treatments Germinating grasses	RO-NEET 720 EC	4.75 to 6.25 L/ha	45	Use on mineral soils only. Both herbicides should be applied to a dry, clod-free soil and incorporated immediately. Use lower rates on sandy soils. Not effective on highly organic soils. Apply in 200 to 400 L of water/ha.
Preemergence Treatments Germinating Grasses	NATA SODIUM TCA	11 to 17 L/ha		Use only on mineral soils. Do not feed tops to livestock.
Germinating broadleaved weeds	PYRAMIN FL 430 Su	8.2 to 10.25 L/ha	-	Use only on mineral soils. Can be tank mixed with 5.50 to 6.75 kg/ha TCA for control of both broadleaf weeds and grasses.
Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
	GRAMOXONE PDQ L	2 to 4 L/ha		Apply Gramoxone PDQ in 100 L of water/ha on a dark, cloudy day for best results.
Postemergence Treatments Annual broadleaf weeds	PYRAMIN FL 430 Su	8.2 L/ha	-	Apply after the first true leaf of beets is 2.5 cm long and before weeds have reached the 4th true leaf stage. Apply with 1/3 to 1/2 L Cittowett Plus.
	SPIN-AID 150 EC	5.0 to 6.6 L/ha	70	Use up to 28 L of water per L of Spin-Aid. Crop injury may occur under hot or rapidly changing climate conditions. Beets past the 3 true leaf stage are safely treated.
Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
	GRAMOXONE PDQ L	2 to 4 L/ha		Apply Gramoxone PDQ in 200 to 500 L of water/ha on a dark, cloudy day for best results.

BEETS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Insects				
Leaf miner	DIAZINON 500 EC	1.1 L/ha	14	
	DIAZINON 50 WP	1.1 kg/ha	14	
	MALATHION 500 EC	1.75 L/ha	7	
	MALATHION 25 WP	4.5 kg/ha	7	
Diseases				
Cercospora leaf spot	FIXED COPPER	Manufacturer's directions	1	Usually appears late in the season. Spray at 7 to 14 day intervals. Follow a 2 to 3 year rotation.

CARROTS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Treatments Germinating annual grasses and some broadleaf weeds	TRIFLURALIN:			Lightly incorporate, 8 to 10 cm depth within 8 to 24 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year. Mineral soils only. Use in conjunction with postemergence herbicide.
	BONANZA 400	1.5 to 2.75 L/ha		
	RIVAL 60 DF	1.0 to 1.9 kg/ha		
	TREFLAN 480	1.2 to 2.3 L/ha		
Preemergence Treatments Annual Weeds	AFOLAN F 480	1.3 to 1.9 L/ha	-	Should be applied soon after seeding. Use lower rate on sandy soils. Carrots are sensitive at time of emergence and heavy rains or irrigation following treatment may result in injury.
	LOROX 50 DF	1.1 to 3.25 kg/ha	-	
	GESAGARD 80 WP	2.25 to 4.25 kg/ha	-	Should be applied soon after planting. Do not use at or near time of emergence.
Preemergence followed by Postemergence Germinating Annuals and Emerged Weeds	AFOLAN F 480 followed by AFOLAN F 480	1.3 to 1.9 L/ha 1.9 to 2.5 L/ha		These treatments must be at least 2 weeks apart. See preemergence and postemergence remarks above.
	LOROX 50 DF followed by LOROX 50 DF	1.1 to 2.25 kg/ha 2.25 to 4.5 kg/ha		
	GESAGARD 80 WP followed by LINURON:	2.25 to 4.25 kg/ha	-	On organic soils, a combination procedure which has been successful is to use the pre-emergence prometryne treatment followed by a postemergence linuron treatment as required. Carrots to be exported to the U.S. should not be treated with Gesagard.
	LOROX 50 DF	1.1 to 3.25 kg/ha		
	or AFOLAN F 480	1.3 to 2.3 L/ha		
Postemergence Treatments Annual Weeds	HERBICIDAL OIL (Weedkiller No. 1)	600 to 800 L/ha (overall spray) 300 to 400 L/ha (rows only)	30	Apply undiluted. Apply as soon as true leaves develop but before carrots are thicker than a pencil. Later treatments may result in an oil flavor in carrots. Weeds should be less than 10 cm high.
	AFOLAN F 480	1.9 to 4.7 L/ha	-	Apply after carrots are 8 to 15 cm high. Temporary yellowing of carrot leaves may occur. If a pre-emergence treatment of a linuron product was used reduce the postemergence treatment to 0.8 kg/ha (active).
	LOROX 50 DF	2.25 to 4.5 kg/ha		

CARROTS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Stale Seedbed Technique	REGLONE L	2.7 to 5.5 L/ha		Apply before crop emergence to foliage of emerged weeds. Read label for water volumes required per hectare.
	GRAMOXONE L	2.7 to 5.5 L/ha		
	GRAMOXONE PDQ L	2.0 to 4.0 L/ha		
	IGNITE 15 Sn	2.7 to 5.0 L/ha		
Annual Grasses	HOE-GRASS 284 EC	3.5 L/ha	-	Apply when grasses are in 1 to 4 leaf stage. Do not tank mix with other products. Does not control quackgrass.
	EXCEL SUPER 80.5	0.67 L/ha	90	Apply when annual grasses are actively growing in the 1 to 6 leaf stage.
Quackgrass and Annual Grasses	FUSILADE II (125)	0.60 to 2.0 L/ha	50	Apply when crop is 10 cm in height or less. Use the high rate for quackgrass control. Do not tank-mix with other herbicides.
Insects				
Aster leafhopper		Action Threshold		5 leafhopper adults/25 sweeps. See Publication 1400 for further details on monitoring.
	SEVIN SL 420 SU	1.2 to 2.5 L/ha	1	Apply when leafhoppers first appear and repeat when the Action Threshold is reached. Otherwise apply at 7 to 10 day intervals until the end of August or 20 days before harvest for early carrots.
	SEVIN 85 WP	2.0 kg/ha	1	
	SEVIN 80 SP	1.5 kg/ha	1	
	SEVIN 50 WP	3.5 kg/ha	1	
	SEVIN XLR 43 SU	1.25 to 2.5 L/ha	1	
Carrot rust fly (2nd generation)		Action Threshold		For fresh market carrots 0.1 flies/trap/day. For processing carrots, 0.2 flies/trap/day. See Publication 1400 for further details on monitoring.
	DIAZINON 50 WP	1.1 kg/ha	10	Apply in 550 L of water with no more than 3 applications per season.
	DIAZINON 500 EC	1.1 L/ha	10	
	CYMBUSH 250 EC	280 ml/ha	35	
Carrot weevil		Action Threshold		1.5 to 5.0 weevils/trap, (cumulative value) spray at two leaf stage.
	IMIDAN 50 WP	2.25 kg/ha	40	Use up to 1000 L/ha. Do not apply more than twice per year. **Imidan should not be used on carrots that will be shipped to the USA either as fresh or processed.**

CARROTS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Cutworms	LORSBAN 25 WP	4.5 to 9 kg	60	Apply when cutworms are noticed. 1 application per season.
	LORSBAN 4E	2.4 to 4.8 L ha	60	
	PYRIFOS 50 WP	2.25 to 4.5 kg/ha	60	
	RIPCORD 400 E	175 ml/ha	21	Spray under warm, moist conditions. Do not disturb soil for 5 days.
Diseases				
Cavity Spot	RIDOMIL 2G	25 kg/ha	at planting	Apply in the seed furrow at the time of planting. Make only one application per year. Refer to the label for further information.
Aster yellows disease	-	-	-	SEE ASTER LEAFHOPPER IN INSECT SECTION.
Leaf spots & blight	BRAVO 500 F	2.4 to 3.2 L/ha	1	Apply at 7 to 10 day intervals beginning when disease is observed. Do not grow carrots successively in the same field.
	DITHANE 75 DG	2.25 kg/ha	7	
	PENNCOZEB 75 DF	2.25 kg/ha	7	
	DITHANE M-45 80WP	2.25 kg/ha	7	
	MANZATE 200 80WP	2.25 kg/ha	7	
	MANZATE 200 75 DF	2.25 kg/ha	7	
	MANEB 80 WP	1.1 to 3.25 kg/ha	5	
	DITHANE M-22 80 WP	1.1 to 3.25 kg/ha	5	
	ZINEB 80 WP	1.1 to 3.3 kg/ha	7	
	POLYRAM 80 DF	2.25 kg/ha	7	
Sclerotinia white mold	BENLATE 50 WP	0.25 to 1.1 kg/ha	15	Apply at the first sign of disease and repeat at 7-10 day intervals. Do not apply more than three times per season. For canning carrots only. Practise a 3 year rotation with non-susceptible crops.

CELERY

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Post-emergence treatments Seedling annuals	HERBICIDAL OIL (Weedkiller No. 1)	600 to 800 L/ha (overall spray) 300 to 400 L/ha (rows only)	-	Apply herbicidal oil undiluted. Use only on outdoor seedbeds, and only if soil is moist. Apply as first true leaves of crop develop and before weeds are 10 cm high.
	AFOLAN F 480 Su	1.9 to 4.7 L/ha	-	Should be applied 8 to 10 days after transplanting. Some temporary yellowing may occur.
	GESAGARD 80 WP	2.25 to 2.75 kg/ha	-	Apply to transplanted celery only, 7 to 14 days after transplanting and before weeds reach 5 cm in height.
Stale Seedbed Technique	REGLONE L	2.7 to 5.5 L/ha		Apply before crop emergence to foliage of emerged weeds.
	GRAMOXONE L	2.7 to 5.5 L/ha		
Insects				
Aster leafhopper	SEVIN 85 WP	0.6 to 1.3 kg/ha	3	Aster leafhoppers spread aster yellows. Apply 3 to 4 sprays at 10 day intervals beginning early July. Also spray weeds in headlands and control leafhoppers on adjacent carrots and lettuce. Discontinue sprays 20 days before harvest.
	SEVIN 50 WP	1.1 to 2.2 kg/ha	3	
	SEVIN XLR 43 Su	1.3 to 2.5 L/ha	5	
	SEVIN L 420 Su	1.25 to 2.5 L/ha	3	
	MALATHION 500 EC	2 L/ha	7	
	MALATHION 25 WP	4.5 kg/ha	7	
	CYMBUSH 250 EC	140 ml/ha	7	
Tarnished plant bug	THIODAN 4 EC	2 L/ha	14	Cymbush and Sevin used for aster leafhoppers will give some control. Trim celery at harvest.
	THIODAN 50 WP	1.75 kg/ha	14	
	ORTHENE 75%	0.75 to 1.1 kg/ha	21	Do not re-enter sprayed area until product has dried.

CELERY *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Aphids	MALATHION 25 WP	4.5 kg/ha	7	Apply if aphids are plentiful. Trim celery at harvest.
	THIODAN 4 EC	2.0 L/ha	14	
	ENDOSULFAN 50 WP	1.7 kg/ha	14	
	THIODAN 50 WP	1.7 kg/ha	14	
	LAGON 480 EC	700 ml/ha	3	Do not apply more than 4 applications per growing season.
	DIBROM EC	1.1 to 1.65 L/ha	4	
	ORTHENE 75%	0.75 to 1.1 kg/ha	21	Do not re-enter sprayed area until product has dried.
Diseases				
Damping off	THIRAM 75 WP	1.5 kg/1000 L	7	Apply in 70 to 105 L of water per 100 m^2 when seedlings first emerge and repeat at weekly intervals.
	CAPTAN 50 WP	125 to 225 g/100 m^2	-	Use as a dust treatment to soil or in 50 to 85 L of water per 100 m^2. Work into the upper 8 to 10 cm of soil before planting.
	CAPTAN 80 WP	1.5 kg/1000 L	-	Apply 50 to 85 L per 100 m^2. Work into upper 7.5 to 10 cm of soil before planting.
	MAESTRO 75 DF	1.5 kg/1000 L	-	
Early and late blight	BRAVO 500 F	2.4 to 4.0 L/ha	7	Begin spraying when seedlings are 5 cm high and repeat at 7 day intervals. Apply Bravo at 8 to 10 day intervals. Use hot water treated seed and sterilized soil, flats, etc. *** Wash and trim celery.**
	DITHANE 75 DG	2.25 kg/ha	14*	
	PENNCOZEB 75 DF	2.25 kg/ha	14*	
	DITHANE M-45 80 WP	2.25 to 3.25 kg/ha	14*	
	MANZATE 200 80 WP	2.25 to 3.25 kg/ha	14*	
	MANZATE 200 75 DF	2.25 to 3.25 kg/ha	14*	
	MANEB 80 WP	1.1 to 3.25 kg/ha	14*	
	DITHANE M-22 80 WP	1.1 to 3.25 kg/ha		
	ZINEB 80 WP	1.1 to 3.3 kg/ha	14*	
	POLYRAM 80 DF	2.25 to 3.25 kg/ha	14	
	DYRENE 50 WP	2.25 to 3.75 kg/ha	1*	
	FIXED COPPER	manufacturer's directions	1	

CHINESE VEGETABLES

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Germinating annual weeds	DEVRINOL 50 DF	2.25 to 4.5 kg/ha	-	Apply only to seeded Chinese Broccoli, Chinese Radish and Chinese Mustard Cabbage, or transplanted and Chinese Cabbage and Kohlrabi.
Broadleaf control	LONTREL 360	0.56 L/ha	30	Apply post transplant to Chinese Radish, Chinese Broccoli and Mustard Cabbage. Apply in 300 L of water/ha. Adequate testing on different varieties has not been completed in Atlantic Canada.
Postemergence Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Annual Grasses and Quackgrass	POAST 184 EC plus MERGE	0.8 to 2.7 L/ha 1 to 2 L/ha	30	Apply to Chinese Broccoli, Chinese Radish and Kohlrabi.
Insects				
Cutworms	LORSBAN 4 E	2.4 L/ha	32	Preplant treatment for Chinese Cabbage.
Cabbage looper	DIPEL WP	550 to 1100gm/ha		
Diamondback moth	SEVIN XLR 43 Su	2.25 to 5.5 L/ha	21	Chinese Cabbage.
	DIPEL WP	550 gm/ha		
Imported cabbageworm	SEVIN XLR 43 Su	2.25 to 5.25 L/ha	21	Chinese Cabbage.
	DIPEL WP	110 to 275 gm/ha		
Aphids	CYGON 480 EC	700 to 1000 ml/ha	4	Pak Choy, Chinese Cabbage and Chinese Broccoli.
Tarnished plant bug	SEVIN XLR 43 Su	2.25 to 5.25 L/ha	21	Chinese Cabbage.
Flea beetles	SEVIN XLR	1.25 to 2.56 L/ha	21	Chinese Cabbage.
Cabbage maggot	LORSBAN 4E	2 to 7 L/ha	15	Pak Choy, Chinese Cabbage and Cabbage Broccoli. Rate depends on row spacing. See label for details.
	LORSBAN 4E	210 ml/1000 L of water	32	Asian Radish apply 1000 L /1000 m row as a drench over seeded rows 7, 20 and 35 days after seeding.

COLE CROPS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Germinating annual grasses and some broadleaf weeds	TREFLAN 480 EC	1.2 to 2.3 L/ha	-	Preplant incorporated in direct seeded cabbage and cauliflower or transplants of cabbage, cauliflower, broccoli, and brussels sprouts. Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year.
	RIVAL 60 DF	1.0 to 1.9 kg/ha		
	BONANZA 400	1.5 to 2.75 L/ha		
Preemergence Treatments Germinating grasses and some broadleaf weeds	DACTHAL 75 WP (no longer being manufactured)	9.0 to 15.5 kg/ha	-	Apply immediately after seeding or directly over transplants but before weeds emerge. Rainfall or irrigation is necessary for activity. Ragweed, nutsedge, smartweed and mustards are not controlled.
	DEVRINOL 50 DF	2.24 to 4.5 kg/ha	60	Apply to transplanted cabbage, cauliflower and broccoli only.
Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Broadleaf control	LONTREL 360	0.56 L/ha	30	Apply post transplant to cabbage, cauliflower and broccoli. Apply in 300 L of water/ha. Adequate testing on different varieties has not been completed in Atlantic Canada.
Postemergence Emerged Annual Grasses	EXCEL SUPER	0.67 L/ha	60	Apply to actively growing annual grasses in the 1 to 6 leaf stage. For use on cabbage, broccoli and cauliflower.
	POAST 184 EC plus MERGE or ASSIST	0.8 to 2.7 L/ha 1 L/ha 2 L/ha	70	Use on cabbage, cauliflower and broccoli. Treat at the 1 to 6 leaf stage of annual grasses. Use the higher rate for control of volunteer cereals. Apply in 110 to 200 L/ha water. Do not exceed 1.12 L/ha on broccoli.
	FUSILADE II 125 EC	0.8 to 1.0 L/ha	40	Apply to annual grasses at the full 2 to 5 leaf stages (2 to 4 leaves for foxtails). One application per season.

ERRATUM

VEGETABLE CROPS

GUIDE TO PEST MANAGEMENT

1999-2000

Please note the following changes:

Page 18	Root maggots Seedbed Treatments		Delete this entire section
	Root maggots Transplant Water Treatment	Sniper 50 WP	Rate should read 100 g/ 100 L
		Lorsban 50 WP	Rate should read 65 g/ 200 L
Page 19	Root maggots Transplant Drench Sprays	Guthion 50 WP	Rate should read 100 g /100 L
		Sniper 50 WP	Rate should read 100 g/ 100 L
		APM 50 WP	Rate should read 100 g/ 100 L
	Cabbage looper Imported cabbageworm Diamondback moth larvae	Pounce 384 EC	Rate should read 90 to 175 mL/ha

June 11, 1999

COLE CROPS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Postemergence Emerged Quackgrass	POAST 184 EC plus MERGE or ASSIST	2.7 L/ha 2 L/ha	70	Use on cabbage and cauliflower only. Thorough preplant tillage will ensure more uniform quackgrass emergence. Apply at 1 to 3 leaf stage of actively growing quackgrass in 110 to 200 L/ha water. Use merge at 1.0% volume/volume water.
Postemergence Emerged Quackgrass *continued*	FUSILADE II 125 EC	2.0 L/ha	40	Apply to actively growing plants with 3 to 5 fully developed leaves. Rhizomes should be thoroughly fragmented by tillage prior to application. Inter-row cultivation should not occur until 5 days after application.
Postemergence Seedling annual broadleaf weeds lamb's quarters and redroot pigweed	LENTAGRAN 45 WP	2.0 kg/ha	45	May be applied following a ppi application of trifluralin. Use on direct seeded or transplanted cabbage only. Apply on direct seeded cabbage when fully developed true leaves form but prior to head formation. For transplanted cabbage, wait until well established (approx. 14 days after transplanting) but before head formation. Cabbage leaves coming in contact with Lentagran may become discolored.
Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Insects				
Root maggots Seedbed Treatment	GUTHION 50 WP	3.4 to 4.5 kg/ha	-	With narrow row seeding, apply insecticide evenly over whole seedbed and work into upper 3 cm of soil. Do not use emulsions.
	SNIPER 50 WP	3.4 to 4.5 kg/ha		
	APM 50 WP	3.4 to 4.5 kg/ha		
	DIAZINON 5 G	34 kg/ha		
Root maggots Transplant Water Treatment	GUTHION 50 WP	100 g/ 100 L	21	Apply 100 to 150 ml per plant of the solution. Keep mixture well stirred.
	SNIPER 50 WP	3.4 to 4.5 kg/ha		
	AZINPHOS-METHYL 50 WP	100 g/ 100 L	21	
	APM 50 WP	100 g/ 100 L	21	
	LORSBAN 50 WP	650 g/ 200 L	32	For cabbage only. Do not use starter fertilizer or lindane with Lorsban 50 W.
Root maggots Transplant Granular Treatment	LORSBAN 15 G	0.6 to 1 kg per 1000 m row	40	Apply in furrow at planting time.

COLE CROPS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Root maggots Transplant Drench Sprays	GUTHION 50 WP	3.3 to 4.4 kg in 1000 to 1500 L/ ha		Keep mixture well stirred. Apply the mixture using a suitable drenching nozzle. Treatment should be applied within 2 days of transplanting. After the transplants straighten up, cover the insecticide lightly with soil to minimize harm to beneficial predators and parasites.
	SNIPER 50 WP	3.4 to 4.5 kg/ha		
	APM 50 WP	3.3 to 4.4 kg in 1000 to 1500 L/ha		
	LORSBAN 4E	3.5 L/ha in 1000 L/ha	32	Apply 3 days after transplanting, row width 60 cm.
Root maggots Field Seedling	LORSBAN 4 E	1.68 L/ha in 1000 L/ha	32	Apply 12.5 L per 100 m of row, 10 cm on each side of the plant. Apply 7 to 10 days after seeding, 60 cm row width.
Cabbage looper Imported cabbageworm Diamondback moth larvae		Action Threshold		Cole crops should be checked on a regular basis for the presence of caterpillars, beginning just after transplanting. Caterpillars are easier to control when they are small and therefore insecticide applications are more effective when the majority of caterpillars are in the early stages of development. It is advisable to select pesticides from a different chemical group with each application to try to avoid resistance build up.
	DIPEL WP	0.55 to 1.1 kg/ha (loopers) 110 g to 550 g/ha (others)	0 0	Not effective against Diamondback Moth.
	THURICIDE HPC	2.0 to 4.5 L/ha	0	Use higher rates for loopers. Not effective against Diamondback Moth.
	POUNCE 384 EC	90 to 175 m/ha	-	Apply when insects or insect damage first appears. 3 days to harvest for cabbage, cauliflower and brussels sprouts. 7 days to harvest on broccoli. See note under Decis.
	DECIS 2.5 EC	300 to 400 ml in 350 to 500 L/ha	3 1	Use on cabbage and broccoli only. Pounce and Decis are more effective than other insecticides under cool, fall conditions. Will also control late climbing cutworm. Brussels sprouts.
	GUTHION 240 EC	2.25 to 3.5 L/ha		Repeat as necessary. 7 days to harvest on brussels sprouts. 15 days to harvest on broccoli and cauliflower. 21 days to harvest on cabbage.
	SNIPER 240 EC	2.25 to 3.5 L/ha		
	GUTHION 5O WP	1.1 to 1.75 kg/ha		
	SNIPER 50	1.1 to 1.75 kg/ha		
	APM 50 WP	1.1 to 1.75 kg/ha		
	LANNATE L 215 SN	1.25 to 2.25 L/ha		Apply with low pressure ground equipment. Repeat at 5 to 7 day intervals. 1 day to harvest on cabbage. 7 days to harvest on broccoli, brussels sprouts and cauliflower.

COLE CROPS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Cabbage looper Imported cabbageworm Diamondback moth larvae *cont'd.*	MONITOR 480 SN	1.1 to 2.25 L/ha	-	Rates above 1.8 L/ha are for severe infestations only. 7 days to harvest on cabbage and cauliflower. 14 days to harvest on broccoli and brussels sprouts.
	THIODAN 4 EC	1.4 to 2.1 L/ha	7	Use lower rates for small larvae.
	ENDOSULFAN 50 WP	1.1 to 1.75 kg/ha	7	
	THIODAN 50 WP	1.1 to 1.75 kg/ha	7	
	CYMBUSH 250 EC	140 ml/ha	3	
	RIPCORD 400 EC	87.5 to 125 ml/ha	3	
	MATADOR 50 EC	100 ml/ha (Imported Cabbageworm, Diamondback Moth)	1 (cabbage)	Do not apply more than 3 times per season. Allow 7 days between applications.
		200 ml/ha (Cabbage Looper)	3 (broccoli, cauliflower, Brussels sprouts)	
	MATADOR 120 EC	42 ml/ha (Imported Cabbageworm, Diamondback moth)		
		83 ml/ha (Cabbage Looper)		
	ORTHENE 75%	0.75 to 1.1 kg/ha	28	Orthene is a systemic insecticide.
Flea beetles	VITAVAX RS	22.5 ml or 31 gm of product per kg of seed	-	For direct seeded cabbage, cauliflower, broccoli and brussels sprouts.
	THIODAN 4 EC	1.5 to 2.0 L/ha	7	
	THIODAN 50 WP	1.5 kg/ha	7	
	ENDOSULFAN 50 WP	1.1 to 1.75 kg/ha	7	
	SEVIN XLR Plus	1.25 to 2.25 L/ha		Days to harvest is 3 for cabbage and cauliflower, and 5 for broccoli and brussels sprouts.
	MATADOR 120 EC	42 ml/ha		1 day to harvest on cabbage. 3 days for broccoli, cauliflower & Brussels sprouts.
	RIPCORD 400 EC	90 to 125 ml/ha	3	Use up to 3 applications per year.
	DECIS 2.5 EC	300 to 400 ml/ha	3	Use on cabbage only.
	DECIS 5.0 EC	150 to 200 ml/ha	3	

COLE CROPS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Aphids	CYGON 480 EC	0.75 to 1 L/ha	-	4 days to harvest on cabbage, cauliflower and broccoli. 21 days to harvest on brussels sprouts.
	DIMETHOATE 480 EC	0.75 to 1 L/ha		
	LAGON 480 EC	0.75 to 1 L/ha		
	THIODAN 4 EC	1.4 to 2.1 L/ha	7	-
	THIODAN 50 WP	1.7 kg/ha	7	
	ENDOSULFAN 50 WP	1.7 kg/ha	7	
	MONITOR 480 SN	1.1 to 2.25 L/ha	-	7 days to harvest on cabbage. 14 days to harvest on cauliflower, broccoli and brussels sprouts.
Cutworms				For damage to transplants, see the section on Chemical Control of "Wireworms and Cutworms". For mature cabbage, damage can occur when larvae feed on the bottom half of the heads. Insecticide sprays for cabbageworms that reach the area will control cutworms as well.
Thrips	RIPCORD 400 EC	87 to 125 mL/ha	3	Control of thrips may be achieved when spraying for cabbageworms by alternating synthetic pyrethroids with diazinon, Guthion, azinphos-methyl or APM. It is critical to control them at early head formation (3 inch leaf ball).
	CYMBUSH 250 EC	200 ml/ha	3	Add AGRAL 90 surfactant at 300 ml/1000 L of mix.
Slugs (Grey Garden)	LANNATE L 215 SN	3.25 L/ha	30	Apply in 1 application with ground equipment and use sufficient water volume for good coverage. Apply late in the evening when slugs are more active. For brussels sprouts only.
Diseases				
Black rot	Hot Water	-	-	Contact extension service for methods.
Damping Off, Wirestem	VAPAM	Follow manufacturer's directions	-	Fumigate seed beds in fall prior to planting.
	VORLEX		-	
Damping Off	CAPTAN 50 WP	125 to 225 g/100 m^2	-	Apply as a dust to soil or in 50 to 85 L of water per 100 m^2. Work into the upper 8 to 10 cm of soil before planting.
	CAPTAN 80 WP	1.5 kg/1000 L	-	Apply 50 to 85 L per 100 m^2. Work into upper 7.5 to 10 cm of soil.
	MAESTRO 75 DF	1.5 kg/1000 L	-	
Clubroot	QUINTOZENE 75 WP	250 to 270 g/100 L	-	Apply 200 to 350 ml per plant at transplanting. Provide good agitation. When growing transplants in the field, fumigate with Vapam or Vorlex (follow manufacturer's directions). Avoid infested fields. If this is not possible, adjust pH of field soil to 7.2 or use at least 1700 kg/ha hydrated lime in the spring at least 6 weeks prior to planting. Maintain high soil levels of calcium and magnesium.

COLE CROPS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Downy mildew Black leaf spot *(Alternaria)*	BRAVO 500 F	2.5 to 4.8 L/ha	7	Downy mildew may appear in the seed bed or later in the season. Black leaf spot may appear at any time during season. Cabbage intended for long term storage should be treated 3 to 4 times in the later part of the season. Use a spreader sticker with WP formulations. Brussels sprouts should be sprayed at the first sign of disease after sprouts begin to form. Rovral may be used on cabbage and cauliflower. For *Alternaria* control on storage cabbage apply 1 application of Rovral 7 to 14 days prior to harvest. For *Alternaria* control on cauliflower apply 1 application of Rovral 1 to 2 days prior to tying . Broccoli head rot may be caused by the fungus *Alternaria* or *Pseudomonas* (bacteria). However, bacterial head rot caused by *Pseudomonas* is the most prevalent. Avoid high nitrogen applications, irrigation and pesticide applications during heading. Most pesticides contain surfactants which enhance decay. Cultivars differ in their susceptibility. Contact extension services for details. Fixed copper is registered for use on cabbage , broccoli and cauliflower. However, it may be phytotoxic, especially to cauliflower.
	ZINEB 80 WP	1.1 to 3.3 kg/ha	7	
	FIXED COPPER	Follow Manufacturer's directions	1	
	ROVRAL 50 WP	3.0 kg/ha	7 (cabbage) 5 (cauliflower)	

CORN (SWEET)

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Quackgrass and other perennials	AMITROLE-T 200 Sn	17 to 22 L/ha	-	Apply in fall or spring to actively growing quackgrass (15 to 20 cm high). Plow or disk 10-14 days after application. Good control of dandelion.
	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated (PPI) Primarily annual grasses	ERADICANE 800 EC	4.25 to 8.5 L/ha	-	Preplant incorporated on mineral soil only. Apply to a dry soil surface and incorporate within 15 minutes. Use low rate on light weed infestations or on light soils. Can be incorporated with atrazine for better broadleaved weed control. Can be tank mixed with atrazine or Bladex for better weed control.
Preplant Incorporated or Preemergence Annual Grasses	DUAL II	2.0 to 2.75 L/ha	80	Can be applied either (i) preplant incorporated - immediate incorporation not necessary; (ii) pre-emergence - requires rainfall or irrigation within 7 days. Apply high rate on heavy soils or on heavy weed infestations. Can be tank mixed with atrazine, or BLADEX for better broadleaf weed control. Refer to label. PRIMEXTRA is a mixture of DUAL and atrazine or (iii) early postemergence for annual grass infestation including fall panicum control. Corn should be at spike to 2 leaf stage. Annual grasses at maximum of 2-leaf stage. Do not use oil or surfactants.
	DUAL II MAGNUM	1.25 to 1.75 L/ha	80	
	FRONTIER	1.25 to 1.4 L/ha		Apply either as a preplant incorporated or preemergence. Use the higher rate when preemergence application is to be made.
Preplant Incorporated/Pre or Postemergence Annual grasses and broadleaf weeds	BLADEX 480 Su	Consult label. Rates vary depending on the timing of application or when used in combination with other herbicides.	-	Can be applied either (i) preplant incorporated, (ii) preemergence or (iii) postemergence (WP formulations only and do not use surfactants). Chemically related to atrazine but BLADEX has better activity against annual grasses, (except barnyard grass) can be less safe on corn and less residual in the soil. BLADEX can be used in combination with atrazine or some of the grass herbicides above. Read label for the many uses of BLADEX. Barnyard grass and Redroot Pigweed may escape.
	BLADEX 90 DF		-	

CORN (SWEET) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Preplant Incorporated/Pre or Postemergence Primarily annual broadleaf weeds	ATRAZINE 90 WP AATREX NINE-O	Consult label. Rates very depending on the method of application or when used in combination with other herbicides.	- -	Can be applied: (i) preplant incorporated, (ii) preemergence, or (iii) postemergence with a suitable surfactant. Atrazine promotes annual grasses, e.g. barnyard grass, crabgrass, etc. and is generally used in combination with a grass herbicide (see above). Carryover more likely to occur on light soils, in dry years and from late or postemergence applications. Read label for atrazine uses. Other formulations of atrazine are available.
Preemergence annual and broadleaf weeds	PRIMEXTRA LIGHT (DUAL + ATRAZINE)	5.8 to 7.7 L/ha		Higher rate should be used on heavy soils.
	PRIMEXTRA II MAGNUM	3 to 4 L/ha		
Postemergence Including triazine resistant strains, primarily broadleaf control	BASAGRAN 480 Sn plus ASSIST	1.75 to 2.25 L/ha 2 L/ha	-	Postemergence only when corn is at 1 to 5 leaf stage. Reduce ASSIST to 1 L/ha under hot, humid conditions. Control is best when broadleaf weeds are small and actively growing. A split application will control some broadleaf perennials like Canada thistle. Does not control weeds germinating after application.
	BASAGRAN FORTE	1.75 to 2.25 L/ha		No Adjuvant required.
	LADDOK plus ASSIST	3.0 to 4.0 L/ha 1.0 L/100 L of spray solution		LADDOK is a mixture of BASAGRAN and atrazine, it will give some residual control and will control emerged triazine-resistant biotypes. If Dual was applied preemergence, reduce Laddok rate to 2.0 to 2.5 L/ha.
	PARDNER 280 EC	1.0 to 1.2 L/ha	-	Postemergence only for control of broadleaf weeds, including triazine-resistant biotypes. Apply when weeds are in 1 to 4 leaf stage and corn is at the 4 to 8 leaf stage. Severe leaf burn may occasionally occur; however, yields have not been affected.
	ATRAZINE 500 plus LENTAGRAN 45 WP	2L/ha 1.0 kg/ha		Lentagran has not been tested adequately in Atlantic Canada, however, this treatment is considered to be excellent on triazine-resistant weeds, such as Redroot Pigweed and Lambsquarter.

CORN (SWEET) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Insects				
Seed corn maggot Wireworm	COUNTER 15 G	75 g/ 100 m of row		Apply only at seeding.
	FORCE 1.5 G	75 g/ 100 m of row		
	-	-		See also "Seed treatment"
Corn earworm	POUNCE 384 EC	275 to 375 ml/ha	1	Monitor for adult moths using pheromone traps. Apply an insecticide to protect the fresh silks when the first moth is captured. Repeat spray every 3 to 5 days depending on the abundance of moths, and weather factors. Alternatively, begin spray program two days after the first silks appear. Stop spraying when silks dry up.
	RIPCORD 400 EC	175 ml/ha	5	
	LANNATE L	1.8 to 2.6 L/ha	3	
	SEVIN 85 WP	1.25 to 2.0 kg/ha	1	
	SEVIN 80 SP	1.5 to 2.24 kg/ha	1	
	SEVIN 50 WP	2.24 to 3.36 kg/ha	1	
	SEVIN XLR	4.0 L/ha	1	
	SEVIN L 420 SU	2.5 to 4.0 L/ha	1	
	DECIS 5.0 EC	250 to 300 ml	5	Do not apply more than twice.
European corn borer	FURADAN 480 F	1.1 L/ha		Use pheromone traps placed in weedy margins of fields to detect adult emergence. Watch for pinhole feeding on leaves of corn. Apply one of the insecticides listed or those listed for corn earworm. Repeat every five days. Direct spray into the whorls, use at least 1100 l/ha of water.
	LANNATE L	2.6 L/ha	3	
	ORTHENE 75%	0.75 - 1.1 kg/ha	21	
Fall armyworm	as for corn earworm			Apply early in the morning when dew is present. This insect is usually present late in the summer
Diseases				
Three-Leaf Dieback	DCT Seed Treatment	125 g/25 kg seed	-	Follow manufacturer's directions
Rust	BRAVO 500	3.2 L/ha	14	Maximum of 2 applications per year. Apply when symptoms first appear and then again 10 to 14 days later.
	TOPAS 250 E	500 ml/ha	14	Apply when rust first appears and 14 days later if necessary.
Northern and Southern Corn Leaf Blight *Helminthosporium* Leaf Spot Eye Spot Grey Leaf Spot	TOPAS 250 E	250 to 500 ml/ha	14	Apply when disease first appears. For Eye Spot and Grey Leaf Spot use the higher rate.

CUCUMBER

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Germinating annuals	ALANAP 240 Sn	11.0 to 30.0 L/ha	-	Apply immediately after seeding and before weeds emerge. In transplanted cucumbers apply after the crop is established, but before weeds emerge. If soil is dry, 1 cm irrigation will improve control. Temporary stunting may occur. Use lower rate on light soils.
Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
	GRAMOXONE PDQ L	2.0 to 4.0 L/ha		
Postemergence Annual grasses and volunteer cereals	POAST 184 EC plus MERGE or ASSIST	0.8 to 1.1 L/ha plus 1.0 L/ha	30	Apply when grasses are actively growing in the 1 to 6 leaf stage. Do not use on greenhouse cucumbers.
	FUSILADE II 125 EC	0.8 to 1.4 L/ha	30	Apply to annual grasses at the full 2 to 5 leaf stages (2 to 4 leaves for foxtails).
Quackgrass and annual grasses	POAST 184 EC plus MERGE (oil) or ASSIST	2.7 L/ha plus 1 to 2 L/ha	30	Apply to actively growing quackgrass in the 1 to 3 leaf stage. Inter-row cultivation 7 to 14 days after application will improve control.
	FUSILADE II 125 EC	2.0 L/ha	30	Apply to actively growing plants with 3 to 5 fully developed leaves. Rhizomes should be thoroughly fragmented by tillage prior to application. Inter-row cultivation should not occur until 5 days after application.
Broadleaf and grasses Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
	GRAMOXONE PDQ L	2.0 to 4.0 L/ha		

CUCUMBER *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Insects				
Preplant Cutworms and Wireworms				See section on "Wireworm, White Grubs and Cutworm Control".
Seedcorn maggots				See "Seed Treatment".
Postplant Cutworms	SEVIN 50 WP	2.2 kg/ha	3	Apply when insects or damage appears.
	SEVIN 85 WP	1.75 kg/ha	3	
	SEVIN 80 SP	1.5 kg/ha	3	
	SEVIN XLR 43 SU	2.5 L/ha	3	
	SEVIN L 420 SU	2.5 L/ha	3	
	LORSBAN 4E	1.2 to 2.4 L/ha	60	
Cucumber beetles	METHOXYCHLOR 50 WP	1.75 to 4.5 kg/ha	1	Use with caution on cucurbits.
	THIODAN 4 EC	1.5 L/ha	2	Apply when insects first appear.
	ENDOSULFAN 50 WP	1.1 kg/ha	2	
	THIODAN 50 WP	1.1 kg/ha	2	
	GUTHION 240 EC	2.25 L/ha	6	See cautions on the label for the handling of soluble bags. Cucumber beetles may transmit bacterial wilt.
	SNIPER 240 EC	2.25 L/ha		
	GUTHION 50 WP	1.1 kg/ha	6	
	GUTHION SOLUPAK 50 WP	1.1 kg/ha	6	
	SNIPER 50 WP	1.1 kg/ha		
	APM 50 WP	1.1 kg/ha	6	
Two-spotted spider mite	KELTHANE 35 WP	1.1 to 1.75 kg/ 1000 L	7	Usually a problem only in hot, dry weather.

CUCUMBER *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Diseases				
Pythium root rot	RIDOMIL 240 EC	9 to 18 ml/100 m	at planting	Apply in a 18 cm band immediately after seeding or prior to transplanting. Incorporate mechanically in the top 5 cm of soil before transplanting or irrigate with 15 to 25 mm of water. Do not apply over the top of transplants as a drench. Do not dip transplants.
Angular leaf spot	FIXED COPPER	Manufacturer's directions	1	Apply at first sign of the disease and at 7 to 10 day intervals. An alternating schedule may be used with a fungicide listed for *Alternaria* leaf spot control. If angular leaf spot is severe, apply FIXED COPPER with each spray.
Alternaria leaf spot Anthracnose Downy mildew	BRAVO 500 F	4.8 L/ha	1	Apply when plants begin to vine. An alternating schedule with FIXED COPPER will help control angular leaf spot. Apply at 7 to 10 day intervals.
	DITHANE 75 DG	1.1 to 3.25 kg/ha	14	
	DITHANE M-45 80 WP	1.1 to 3.25 kg/ha	14	
	MANZATE 200 80 WP	2.25 to 3.25 kg/ha	14	
	MANZATE 200 75 DF	2.25 to 3.25 kg/ha	14	
	PENNCOZEB 75 DF	1.1 to 3.25 kg/ha	14	
	MANEB 80 WP	1.1 to 3.25 kg/ha	5	
	DITHANE M-22 80 WP	1.1 to 3.25 kg/ha	5	
	DYRENE 50 WP	2.5 to 3.75 kg/ha	1	
Bacterial Wilt	-	-	-	Control cucumber beetles - SEE CUCUMBER BEETLES IN INSECT SECTION.
Powdery mildew	BRAVO 500 F	4.8 L/ha	1	As soon as disease appears, spray at 7 to 10 day intervals. Tank mix Benlate with Manzate 200.
	MANZATE 200 80 WP plus BENLATE 50 WP	2.25 kg/ha 500 to 850 g/ha	14	

GARLIC

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha	-	
	GLYFOS	2.5 to 7.0 L/ha	-	
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha	-	
Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Preemergence	DACTHAL 75WP	9.0 to 18.0 kg/ha		Apply at seeding or at transplanting.
	DEVRINOL 50 DF	2.24 to 4.5 kg/ha		Apply only one application per season.
Postemergence Annual grasses	POAST 184 EC Plus ASSIST Oil Conc. or MERGE	0.8 to 1.6 L/ha 2.0 L/ha 1.0 L/ha	60	Apply postemergence to annual grasses in the 1 to 6 leaf stage.
Quackgrass	POAST 184 EC Plus ASSIST Oil Conc. or MERGE	2.7 L/ha 2.0 L/ha 1.0 L/ha	60	Apply at 1 to 3 leaf stage of actively growing quackgrass. Apply in 110 to 200 L/ha of water. Use Merge at 1% volume/volume of water.
Broadleaf Weeds	PARDNER (280 g/l)	1.0 L/ha	58	Apply in 200 to 300 L/ha of water, early post emergence to weeds.
Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Insects				
Aphids and Thrips	MATADOR 120 EC	188 ml/ha	14	Thrips only. 3 applications per season.
	MALATHION 25 WP	4.25 kg/ha	3	
	MALATHION 500 E	2 L/ha	3	
Onion Maggots	LORSBAN 4 E	3.5 L/ha in 1000 L of water	50	Apply as a drench over the row on newly emerged plants (in the spring).
Diseases				
Purple Blotch *Alternaria*	DYRENE 50 WP	2.5 to 3.75 kg/ha	-	Apply as necessary.
Green Mold *Penicillium*	ROVRAL 50 WP	4.0 g/L water	-	Dip garlic cloves in the Rovral suspension for 30 minutes prior to planting in the fall.

GINSENG

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Diseases				
Root Rot	VORLEX PLUS	Follow Manufacturer's Directions	-	*Rhizoctonia, Fusarium, Phytophthora, Pythium* and *Cylindrocarpon* may cause seedling damping off and/or root rot. Avoid overcrowding and poorly drained soils.
	VORLEX CP		-	
	TELONE C -17		-	
	BUSAN		-	
	VAPAM 1020		-	
	QUINTOZENE 75 WP	9.0 kg/ha in 3415-4500 L water	-	Quintozene may be used to control *Rhizoctonia*, crown rot and damping off. Apply in a high volume spray only once per year prior to bud break. Do not apply within 24 months of anticipated harvest date. Do not plant any other root crop for a minimum of 1 year following ginseng harvest. See label precautions.
	RIDOMIL 2 G	31.25 kg/ha	9	Use a suitable granular spreader to spread granules evenly. One application is to be made in the spring just prior to the time plants begin to grow. Make a second application 6 weeks later and a third application 6 weeks after the second one. Do not make more than 3 applications per season.
	RIDOMIL 240 EC	1.3 L/ha	9	For damping off and root rot control apply prior to emergence of seedlings. Apply in a minimum of 2500 L of water per hectare. Do not apply to emerged foliage.
	ALIETTE 80 WDG	5.5 kg/ha	31	Apply a maximum of 5 applications per year. Use a minimum of 200 L of water per hectare.

GINSENG *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Alternaira Blight	DITHANE 75 DG	4.4 kg/ha in 2000 L of water	30	Avoid applications in temperatures over 30°C. Apply at first sign of disease. Do not use Rovral more than 3 times per season and alternate with other fungicides.
	PENNCOZEB 75 DF	4.4 kg/ha in 2000 L of water	30	
	DITHANE M-45 80 WP	4.4 kg/ha in 2000 L of water	30	
	ROVRAL 50 WP	1.1 kg/ha in 2000 L of water	30	
	DYRENE 50 WP	4.4 kg/ha in 2000 L of water	30	
	BRAVO 500 F	2.3 L/ha	14	Bravo will also control *Botrytis*. Start applications when disease threatens and repeat at 7 to 10 day intervals. Do not apply more than 6 times per season.

LEEKS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Postemergence Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Insects				
Thrips	MALATHION 25 WP	4.25 kg/ha	3	
	MALATHION 500 E	2 L/ha	3	
Diseases				
Purple Blotch *Alternaria*	DYRENE 50 WP	2.5 to 3.75 kg/ha	-	Apply as necessary.

LETTUCE

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses. Apply Ignite in 110 to 330 L of water per ha.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
	IGNITE 15 Sn	2.7 to 5.0 L/ha		
Germinating annuals	CHLORO IPC 4.8 EC	10.0 to 14.0 L/ha	-	For preemergence application in direct-seeded lettuce. Use low rate in cool wet weather to avoid injury and delay in emergence. Use low rate on mineral soils and higher rate on muck soils.
Preemergence Annual Grasses and some Broadleaves	KERB 50 WP	4.4 to 9.0 kg/ha	55	Use on mineral soils only. Do not replant a second crop of lettuce in the same season. Kerb can also be applied Preplant Incorporated to direct seed lettuce only.
Postemergence Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Postemergence	KERB 50 WP	4.4 to 9.0 kg/ha	55	Transplanted lettuce only, apply Kerb 7 to 10 days after transplanting.
Insects				
Preplant Cutworms				See section "Control of Wireworms, White Grubs, Cutworm and Slugs".
Aster leafhopper	THIMET 15 G	7.25 kg/ha	-	Aster leafhoppers carry aster yellows. Distribute the granules in the fertilizer band on one or both sides of the row at seeding time, or when plants are transplanted in the field. Planting time only.
	DI-SYSTON 15 G	40 to 75 g/100 m row	-	Inject on each side of the seed furrow at planting time only. Do not apply to transplanted lettuce. Under adverse conditions, there may be some delay in emergence, stunting or reduction of stand. Planting time only.

LETTUCE *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Aster leafhopper *continued*	MALATHION 500 EC	2.5 L/ha	-	Weekly or twice weekly during growing season. Only needed when granules are not used at planting. 3 days to harvest on head lettuce. 14 days to harvest on leaf lettuce.
	MALATHION 25 WP	3.4 to 4.5 kg/ha	-	
	SEVIN 50 WP	2.2 to 3.3 kg/ha	-	Apply when insects or damage appears. 3 days to harvest on head lettuce. 14 days to harvest on leaf lettuce.
	SEVIN 85 WP	1.25 to 2.75 kg/ha	-	
	SEVIN 80 SP	1.5 to 3.0 kg/ha	-	
	SEVIN L 420 SU	1.25 to 2.5 L/ha	-	
	RIPCORD 400 EC	125 ml/ha	14	
	CYMBUSH 250 EC	200 ml/ha	14	7 to 14 day spray interval. Up to 4 applications per season.
Aphids	PIRIMOR 50 WP	0.3 to 05 kg/ha	7	Apply if aphids are a problem.
	PIRIMOR DF	300 to 500 g/ha	7	
	MALATHION 500 EC	2.5 L/ha	-	Weekly or twice weekly during growing season. Only needed when granules are not used at planting. 14 days to harvest on leaf lettuce. 3 days to harvest on head lettuce.
	MALATHION 25 WP	3.4 to 4.3 kg/ha		
	CYGON 480 EC	0.7 L/ha	7	
	LAGON 480 EC	0.7 L/ha	7	
	THIODAN 4 EC	2 L/ha	14	Not on leaf lettuce.
	MONITOR 480 EC	1.1 to 2.5 L/ha	14	Not on leaf lettuce.
	ORTHENE SP	0.75 to 1.1 kg/ha	7	Head lettuce only. Orthene is systemic.
Cabbage Looper	DIPEL WP	1.1 kg/ha	0	Other caterpillars may be controlled when these insecticides are used.
	THURICIDE HPC	4.25 L/ha	0	
	MATADOR 120 EC	83 ml/ha	3	
	LANNATE L 215 Sn	2.25 to 4.5 L/ha	7	Do not use on leaf lettuce.
	DIBROM 9.6 EC	1.1 L/ha	4	

LETTUCE *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Diseases				
Damping Off	FERBAM 76 WDG	2 kg/1000 L	-	Apply as a soil drench when seedlings first emerge and repeat at 2 week intervals.
	RIDOMIL 2G	25 kg/ha	at planting	Apply Ridomil for control of damping off or stunt diseases caused by *Pythium spp.* Apply in the seed furrow at the time of planting. For direct seeded head lettuce only. Refer to the label for further information.
Botrytis rot (grey mold)	FERBAM 76 WDG	2.0 kg/1000 L	1	Spray greenhouse grown seedlings before first transplanting and once or twice later at 10 day intervals.
	ROVRAL 50 WP	1.5 kg/ha	4	Apply in 300 to 500 L water/ha. Maximum of 4 applications per year, 7 day intervals.
Aster yellows disease	-	-	-	Control leafhoppers. SEE ASTER LEAFHOPPERS IN INSECT SECTION
Downy Mildew	ZINEB 80 WP	1.7 to 2.75 kg/ha	10	At the first sign of disease, spray at 7 to 10 day intervals. Add a spreader-sticker.
	RIDOMIL GOLD MZ 68 WP	2.5 kg/ha	14	For head lettuce only. Apply every 14 days, beginning at thinning. Make a maximum of 3 applications per season. Apply before the outbreak of disease.
	ALIETTE 80 WDG	2.8 kg/ha	7	Apply when conditions favor disease development. Do not re-enter within 12 hours of application.
Sclerotinia	BOTRAN 75 WP	2.3 to 3.75 kg/ha	14	Maximum of 2 applications per year. Apply as a directed spray to lower portion of plant and on soil surface after thinning. Second application at rosette stage.
	RONILAN 50 EG	1.1 kg/ha	28	Maximum of 3 applications per year. Apply 1 to 2 days after thinning direct seeded, and 5 to 7 days after transplanting. Second and third applications at 10 day intervals.

ONIONS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Germinating annuals	CIPC 480 EC	10 to 20 L/ha	30	Apply either as a preemergence or as a directed postemergence application on organic or mineral soils when weeds are germinating. On mineral soils, use no more than 14 L/ha. Do not use on bunching onions.
	DACTHAL 75 WP	9 to 15.5 kg/ha	-	Apply preemergence, on mineral soils only, to germinating weeds.
Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses. Apply Ignite in 110 to 330 L of water/ha.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
	IGNITE 15 Sn	2.7 to 5.0 L/ha		
Postemergence Emerged broadleaf weeds	GOAL 192 EC (no longer being manufactured)	0.62 L/ha	56	Apply in 500 L/ha water at the 2, fully developed, leaf stage of onions. Repeat applications to control late germinating weeds to a maximum of 2.5 L/ha total per season. Use only on dry bulb onions. Do not apply if crop is under stress.
	GOAL 2 XL	0.5 L/ha	56	
Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Emerged annual grasses	HOE-GRASS 284 EC	3.5 L/ha	-	Apply postemergence to annual grasses in the 1 to 4 leaf stage. Do not tank mix with other herbicides. Use only on bulb onions.
Emerged annual grasses and some broadleaf weeds	PROWL 400 EC	2.5 to 3.75 L/ha	-	Apply preemergence to weeds at the 2 - 6 true leaf stage of onions. Maximum of 2 applications per year. Use only on direct seeded dry bulb onions grown in mineral soils. Prowl has the potential for carry over.

ONIONS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Emerged annual grasses	FUSILADE II 125 EC	0.6 to 1.0 L/ha	42	For volunteer cereal and barnyard grass control, apply 0.8 L Fusilade per hectare at the 2 to 5 leaf stage. For crabgrass and wild oats, use 1.0 L per hectare at the 2 to 5 leaf stage. Foxtail grasses require 1.0 L per hectare at the 2 to 4 leaf stage.
	EXCEL SUPER	0.67 L/ha	60	Dry Bulb Onions only. Apply to actively growing annual grasses in the 1 to 6 leaf stage.
	POAST 184 EC plus MERGE	0.8 to 1.6 L/ha 1 L/ha	-	Apply to annual grasses at the 1 to 6 leaf stage. For dry bulb onions only.
Emerged quackgrass	POAST 184 EC plus MERGE or ASSIST	1.1 to 2.7 L/ha 2 L/ha 4 L/ha	50	Apply at the 1 to 3 leaf stage of actively growing quackgrass. Use on dry bulb onions only.
	FUSILADE II 125 EC	2.0 L/ha	60	Apply at the 3 to 5 leaf stage of actively growing quackgrass.
Insects				
Onion Maggot	DIAZINON 500 EC	140 to 200 ml/ 1000 m row		Apply to furrow at planting. Use lower rate on mineral soils; a higher rate on organic soils. Use sufficient water to drench furrow.
	DIAZINON 50 WP	100 to 170 g/ 1000 m row		
	DIAZINON 50 EC	200 to 375 ml/ 1000 m row	-	
	DIAZINON 5 G	0.9 to 1.9 kg/ 1000 m row	-	Apply to furrow at planting.
	LORSBAN 15 G	32.0 g/100 m row	-	For each 2.5 cm of row width. Apply in the furrow at planting.
	RIPCORD 400 EC	175 m L/ha	3	-
	CYMBUSH 250 EC	280 m L/ha	3	-
Onion thrips	MALATHION 500 EC	2.0 L/ha	3	Treat when damage becomes visible. Repeat as necessary. Apply in sufficient water to ensure thorough coverage. Repeat as necessary.
	MALATHION 25 WP	4.5 kg/ha	3	
	DIAZINON 500 EC	1.1 L/ha	10	
	DIAZINON 50 WP	1.1 kg/ha	10	
	CYMBUSH 250 EC	280 mL/ha	3	
	DECIS 5.0 EC	200 ml/ha	5	Do not apply more than once per season.
	MATADOR 120 EC	188 ml/ha	14	Do not apply more than three times per season.

ONIONS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Diseases				
Smut	PRO-GRO SYSTEMIC DUST SEED PROTECTANT	25 g/ kg seed	-	Use of a methyl cellulose sticker improves control. Thoroughly mix sticker, Pr-Gro and seed.
Botrytis leaf blight, Downy mildew, and Purple Blotch	MANEB 80 WP	1.1 to 3.25 kg/ha	10	Apply at 7 to 10 day intervals beginning the first week in July. Add a spreader-sticker to WP formulations. Alternate with other fungicides in order to prevent disease resistance. DYRENE is not registered for downy mildew control. When Rovral is tank mixed with Maneb, Dithane M-45, or Manzate 200, all 3 leaf diseases will be controlled. Super Spred is a registered surfactant for Rovral on onions.
	DITHANE M22 80 WP	1.1 to 3.3 kg/ha	10	
	DITHANE M-45 80WP	2.25 to 3.25 kg/ha	10	
	DITHANE 75 DG	2.25 to 3.25 kg/ha	10	
	PENNCOZEB 75 DF	2.25 to 3.25 kg/ha	10	
	MANZATE 200 80 WP	2.25 to 3.25 kg/ha	10	
	MANZATE 200 75 DG	2.25 to 3.25 kg/ha	10	
	ZINEB 80 WP	0.85 to 3.3 kg/ha	7	
	ROVRAL 50 WP plus MANEB or MANCOZEB	0.75 kg/ha	15	
	DYRENE 50 WP	2.5 to 3.75 kg/ha	7	
	BRAVO 500 F	2.4 to 4.8 L/ha	7 or 14	For *Botrytis* leaf blight. Start application when disease threatens and repeat at 7 to 10 day intervals. Days to harvest: Green bunching - 14, dry bulb - 7.
Downy mildew	RIDOMIL GOLD MZ 68 WP	2.5 kg/ha	7	Does not control *Botrytis or purple blotch.* Apply before the outbreak of disease. Apply every 7 to 14 days beginning when conditions favour downy mildew. Make a maximum of 3 applications per season. When changing from Ridomil MZ to a contact fungicide, apply within 10 days of the last Ridomil MZ application.
	ALIETTE 80 WDG	2.8 kg/ha	7	Aliette may be applied a maximum of 5 times per year. Do not re-enter treated areas within 12 hours of application. Also controls purple blotch.

PARSNIP

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Treatments Germinating annuals	AFOLAN F 480	1.3 to 2.5 kg/ha	-	Use lower rate on sandy soils. Heavy rain at emergence can cause injury.
Preemergence followed by Postemergence Germinating annuals and emerged weeds	AFOLAN F 480 followed by AFOLAN F 480	1.3 to 1.9 L/ha 1.9 to 2.5 L/ha		These treatments must be at least 2 weeks apart. See preemergence and postemergence Afolan comments above.
Postemergence Treatments Emerged Weeds	HERBICIDAL OIL Agricultural Weedkiller No.1	600 to 800 L/ha (overall spray)	30	Apply undiluted when true leaves develop and before parsnips roots are thicker than a pencil. Later treatments can result in oil flavor. Weeds should be less than 10 cm high.
	AFOLAN F 480	1.9 to 4.7 L/ha	-	Apply when parsnips are 8 to 15 cm high. Use lower rate on sandy soils. Application at high temperature can be injurious.
Inter-row Shielded	GRAMOXONE L	2.75 to5.5 L/ha		Apply before crop emergence to the foliage of emerged weeds.
	REGLONE L	2.75 to 5.5 L/ha		
Insects				
Carrot rust fly	DIAZINON 500 EC	1.1 L/ha	10	
	DIAZINON 50 WP	1.1 kg/ha	10	
	BASUDIN 500 EC	1.1 L/ha	10	
	DIAZINON 5G	850 g/1000 m row	-	Apply in furrow at planting time.
Diseases				
Canker	BRAVO 500 F	2.8 L/ha	7	Start applications in mid-August and repeat at 7 to 10 day intervals. Do not make more than 7 applications per season.

PEAS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha	-	
	GLYFOS	2.5 to 7.0 L/ha	-	
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha	-	
Preplant incorporated germinating annual grasses and some broad leaves	TRIFLURALIN:			Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year.
	TREFLAN 480 EC	1.25 to 1.7 L/ha	-	
	RIVAL 60 DF	1.0 to 1.3 kg/ha	-	
	BONANZA 400	1.5 to 2 L/ha	-	
	PURSUIT 240 Sn	0.312 L/ha	60	Some rotational crop restrictions. Apply only to processing peas.
Preemergence treatments Germinating broadleaf weeds and some grasses	GESAGARD 80 WP	2.25 to 2.75 kg/ha	-	Preemergence to crop and weeds. Will not control triazine tolerant weeds.
	DINOSEB PTK 300 EC	20.4 to 26.4 L/ha	-	Preemergence to crop and weeds. **Not legal for use in New Brunswick.** Reduce application rate to 13.2 L/ha when applied immediately before emergence.
	PURSUIT 240 Sn	0.312 L/ha	60	Apply only to processing peas, some rotational crop restrictions apply.
Postemergence treatments Emerged broadleaf weeds	BASAGRAN 480 Sn plus CITOWETT PLUS	1.75 to 2.25 L/ha plus 0.25 L/100 L spray solution	-	Apply postemergence when peas have 3 pairs of leaves and when weeds are small. No residual activity. A second application can be made. Use 1 L/ha of Assist under hot humid conditions.
	or ASSIST	or 1 to 2 L/ha	-	
	BASAGRAN FORTE L	1.75 to 2.25 L/ha		No adjuvant needed when applying Basagran Forte.
	MCPA-Na-300	0.9 to 1.5 L/ha	-	This rate may not provide satisfactory control of heavy weed populations. Some injury may occur but crop recovery is usually satisfactory. Check MCPA-Na 300 labels for proper rates as they vary depending upon the product purchased. Apply only when crop is at the correct growth stage and is not under stress.
	MCPA-AMINE 500	0.3 to 0.5 L/ha	-	

PEAS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Postemergence Seedling annuals, broadleaf weeds and Canada thistle	TROPOTOX PLUS	2.75 to 4.25 L/ha		Apply when the peas have 3 to 6 expanded leaves and apply in 150 to 200 L of water/ha.
Emerged annual grass	EXCEL SUPER	0.67 L/ha	75	Apply to actively growing annual grasses in the 1 to 6 leaf stage.
	HOE-GRASS 284 EC	2.5 L/ha	60	For postemergence control of grasses in the 2 to 3 leaf stage, including volunteer corn.
	POAST 184 EC plus MERGE or ASSIST	0.8 to 1.6 L/ha 1 L/ha 2 L/ha	60/dry peas 30/for processing peas	FOR PROCESSING AND DRY PEAS ONLY. Apply postemergence to annual grasses in the 1 to 6 leaf stage. Use the higher rate to control volunteer cereals. Do not use on fresh edible pods.
Emerged quackgrass	POAST 184 EC plus MERGE or ASSIST	2.7 L/ha 2 L/ha 4 L/ha	60/dry peas 30/for processing peas	FOR PROCESSING AND DRY PEAS ONLY. Apply at 1 to 3 leaf stage of actively growing quackgrass. Do not use on fresh edible pods.
Insects				
Seedcorn maggot				See - "Seed Treatment".
Pea moth	MALATHION 500 EC	2.0 L/ha	3	
	MALATHION 50 WP	4.25 kg/ha	3	
Aphids	PIRIMOR 50 WP	150 to 275 g in 17 L of water per ha by airplane	6	Use high rate when aphid population is high or during very cool weather.
	PIRIMOR 50 DF		6	
	MALATHION 500 EC	2.0 L/ha	3	Do not apply in bloom. Obtain thorough coverage. Repeat as necessary.
	MALATHION 50 WP	4.25 kg/ha	3	
	CYGON 480 EC	275 to 425 ml/ha	3	Obtain thorough coverage. Repeat as necessary.
	DIMETHOATE 480 EC	275 to 425 ml/ha	3	
	LAGON 480	275 to 425 ml/ha	3	
	DI-SYSTON 15 G	7.5 to 17.5 kg/ha	50	Apply by drilling or broadcasting at planting.
	LANNATE L	2.25 L/ha	1	
Diseases				
Powdery Mildew	KUMULUS 80 DF	1.5 kg/ha	1	Spray at first appearance of disease and repeat at 7 to 10 day intervals as necessary.
	MICRO-NIASUL 92% WP	1.5 kg/ha	1	

PEPPERS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Germinating annual grasses and some broadleaf weeds	TREFLAN 480	1.25 to 2.4 L/ha	-	Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year.
	RIVAL 60 DF	1.0 to 1.9 kg/ha		
	DEVRINOL 50 DF	2.24 to 4.5 kg/ha		Apply only one application per season.
Preemergence	DACTHAL 75 WP (no longer being manufactured)	9.0 to 15.5 kg/ha	-	Apply 2 weeks after transplanting but preemergence to the weeds. Cultivate to control escapes.
Other herbicides: Trifluralin (Rival EC, Triflurex 40 EC, Bonanza 400 L)				
Insects				
Cutworms				See: "Control of Wireworms, White Grubs, Cutworms and Slugs".
Aphids	THIODAN 4 EC	1.5 to 2.75 L/ha	2	
	THIODAN 50 WP	1.0 to 2.25 kg/ha	2	
	ENDOSULFAN 50 WP	1.1 kg/ha	2	
	DIAZINON 500 EC	0.55 to 1.1 L/ha	5	
	DIAZINON 50 WP	0.5 to 1.1 kg/ha	5	
	CYGON 480 EC	0.7 to 1 L/ha	3	
	DIMETHOATE 480 EC	0.7 to 1 L/ha	3	
	LAGON 480 EC	0.7 to 1 L/ha	3	
	PIRIMOR 50 WP	275 to 550 g/ha	3	
	PIRIMOR 50 DF	275 to 550 g/ha	3	
	ORTHENE SP	0.75 kg	7	Green Peach Aphid only. Orthene is systemic.

PEPPERS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
European corn borer	DECIS 2.5 EC	500-600 mL/ha	3	Do not use more than three times a year.
	DECIS 5.0 EC	250 to 300 mL/ha	3	
	SEVIN XLR PLUS	2.2 to 5.25 L/ha	2	
	SEVIN L 420 SU	2.75 to 5.5 L/ha	1	
	SEVIN XLR 43 SU	2.5 to 5.25 L/ha	1	
	ORTHENE 75%	1.1 kg/ha	7	Orthene is systemic.
Tarnished plant bug	SEVIN 85 WP	2.75 kg/ha	1	Apply when insects appear. Repeat as necessary. Aphid sprays will also control this pest.
	SEVIN 80 SP	3.0 kg/ha	1	
	SEVIN 50 WP	4.5 to 5.5 kg/ha	1	
	SEVIN XLR 43 SU	5.25 to 6.4 L/ha	1	
	SEVIN L 420 SU	5.25 to 6.4 L/ha	1	
Diseases				
Damping Off	CAPTAN 50 WP	125 to 225 g/100 m^2	-	Apply as a dust to soil or in 50 to 85 L of water per 100 m^2. Work into the upper 8 to 10 cm of soil before planting.
	CAPTAN 80 WP	1.5 kg/1000 L		Apply 50 to 85 L per 100 m^2. Work into upper 7.5 to 10 cm of soil before planting.
	MAESTRO 75 DF	1.5 kg/1000 L		
Early Blight Bacterial Spot	ZINEB 80 WP	1.1 to 3.25 kg/ha	5	Apply at first sign of the disease and at 7 day intervals. Zineb will not control bacterial spot.
	FIXED COPPER	Follow manufacturer's directions	1	

PUMPKIN & SQUASH

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Germinating annuals	ALANAP 240 SN	11.0 to 30.0 L/ha	-	Apply preemergence immediately after seeding. Do not use on butternut squash or pumpkin. Irrigation will improve control if soil is dry. Use low rates on sandy soil.
Postemergence Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Insects				
Seedcorn maggots				See - "Seed Treatment".
Cucumber beetle Flea beetle	METHOXYCHLOR 50 WP	1.7 to 5.0 kg/ha	1	Apply at first sign of infestation. Repeat at 7 to 10 day intervals as necessary. Cucumber beetles may transmit bacterial wilt disease.
	THIODAN 4 EC	1.5 L/ha	2	
	ENDOSULFAN 50 WP	1.1 kg/ha	2	
	THIODAN 50 WP	1.0 kg/ha	2	
	SEVIN 85 WP	1.75 kg/ha	3	
	SEVIN 80 SP	1.5 kg/ha	3	
	SEVIN 50 WP	2.25 kg/ha	3	
	SEVIN XLR 43 SU	2.5 L/ha	3	
	SEVIN L 420 SU	2.5 L/ha	3	
	GUTHION 50 WP	1.1 kg/ha	14	
	SNIPER 50 WP	1.1 kg/ha		
	DIAZINON 500	1.1 to 2.0 L	3	

PUMPKIN & SQUASH *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Diseases				
Alternaria leaf spot, Anthracnose, Downy mildew, scab, Gummy stem blight	MANEB 80 WP	1.1 to 3.25 kg/ha	14	Begin applications when runners begin to form or at first sign of disease, and then at 7 to 10 day intervals. MANEB and DYRENE are not registered for scab control.
	DITHANE M-22 80 WP	1.1 to 3.25 kg/ha	14	
	DITHANE 75 DG	1.1 to 3.25 kg/ha	14	
	PENNCOZEB 75 DF	1.1 to 3.25 kg/ha	14	
	DITHANE M-45 80 WP	2.25 to 3.25 kg/ha	14	
	MANZATE 200 80 WP	2.25 to 3.25 kg/ha	14	
	DYRENE 50 WP	2.5 to 3.75 kg/ha	1	
	BRAVO 500 F	3.2 to 4.8 L/ha	1	-
	MANZATE 200 80 WP plus BENLATE 50 WP	2.25 kg/ha 550 to 850 g/ha	14	The tank mix of Manzate 200 with Benlate in addition to providing powdery mildew control, may also improve control of some of the other diseases listed.
Powdery mildew	BRAVO 500 F	4.8 L/ha	1	Begin application at first sign of disease and then at 7 to 10 day intervals.
	MANZATE 200 80 WP plus BENLATE 50 WP	2.25 kg/ha 500 to 850 g/ha	14	
Septoria leaf spot	MANEB 80 WP	1.1 to 3.25 kg/ha	14	Begin application at first sign of disease and then at 7 to 10 day intervals.
	DITHANE M-22 80 WP	1.1 to 3.25 kg/ha	14	
	ZINEB 80 WP	2.25 kg/ha	5	

RADISH

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preemergence Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Insects				
Root maggots	DIAZINON 5 G	1.75 kg per 1000 m row	-	Apply in seed furrow at planting time.
	LORSBAN 4E	85 ml per 380 L of water	21	Apply 380 L per 1000 m of row as a drench at planting.
Flea beetles or aphids	DIAZINON 500 EC	1.1 L/ha	10	Apply in sufficient water to ensure coverage. Repeat as necessary.
	DIAZINON 50 WP	1.0 kg/ha	10	
	MALATHION 500 EC	1.8 to 2.0 L/ha	7	Aphids only.
	MALATHION 25 WP	2.25 to 5.5 kg/ha	7	
	METHOXYCHLOR 50 WP	1.7 to 5.0 kg/ha	7	Flea beetles only. Apply at first sign of infestation. Do not feed treated crop or refuse to livestock.
	SEVIN 85 WP	0.75 - 1.25 kg/ha	7	Flea beetle control only.
	SEVIN 80 SP	0.75 to 1.5 kg/ha	7	
	SEVIN 50 WP	1.1 to 2.5 kg/ha	7	
	SEVIN L 420 SU	1.25 to 2.0 L/ha	7	
	SEVIN XLR PLUS	2.5 to 5.25 L/ha	7	

RHUBARB

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. (Establishment year fields only). Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Postemergence Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Insects				
Potato stem borer	NO MATERIAL REGISTERED	-	-	Control weeds. (Especially couchgrass). Burn grass in weedy areas in early spring within and around field margins.
Diseases				
Botrytis leaf rot (forcing sheds)	CAPTAN 50 WP	2.25 kg/1000 L	2	Spray at weekly intervals.
	CAPTAN 80 WP	1.4 to 2.0 kg/1000 L	2	
	MAESTRO 75 DF	1.5 to 2.2 kg/1000 L	2	

SPINACH

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha	-	
	GLYFOS	2.5 to 7.0 L/ha	-	
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha	-	
Preplant incorporated Germinating grasses	RO-NEET 720 EC	4.75 L/ha	-	Preplant incorporated on mineral soils only. Apply to a dry, clod-free soil and incorporate immediately.
Preemergence Germinating annuals	CHLORO IPC 4.8 EC	3.0 to 5.0 L/ha	-	Preemergence on mineral soils only. Use higher rates in warm weather, lower rates in cool weather and on sandy soils.
Stale Seedbed Technique	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Postemergence Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		

SPINACH *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Insects				
Aphids	DIBROM EC	1.1 to 1.65 L/ha	4	
	THIODAN 4 EC	2.1 L/ha	14	Apply when aphids are numerous. Do not apply more than once per season.
	THIODAN 50 WP	1.7 kg/ha	14	
	ENDOSULFAN 50 WP	1.7 kg/ha	14	
	LAGON 480 EC	700 ml/ha	7	
	DIMETHOATE 480 EC	700 ml/ha	7	
Leafminers and Aphids	DIAZINON 500 EC	1.1 L/ha	10	Apply in sufficient water to ensure coverage.
	DIAZINON 50 WP	1.1 kg/ha	10	
	MALATHION 500 EC	2.5 L/ha	7	
	MALATHION 25 WP	5.5 to 7.0 kg/ha	7	
	GUTHION 50 WP	1.1 kg/ha	14	
	GUTHION Solupak 50%	1.1 kg/ha	14	
	SNIPER 50 WP	1.1 kg/ha		
	GUTHION 240 SC	1.8 to 2.2 L/ha	14	
	SNIPER 240 EC	1.8 to 2.2 L/ha		
Diseases				
Downy mildew	FIXED COPPER	Follow Manufacturer's directions	1	Apply at 7-10 day intervals in cool wet weather. Grow tolerant varieties.

TOMATOES (TRANSPLANTED)

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Primarily annual grasses and some broadleaf weeds	DEVRINOL 50 DF	2.25 to 4.5 kg/ha	-	Preplant incorporate to 2.5 to 5 cm soon after application to a dry, clod-free soil. For use on mineral soil only.
	TRIFLURALIN:			Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year.
	TREFLAN 480 EC	1.2 to 2.3 L/ha	-	
	RIVAL 60 DF	1.0 to 1.84 kg/ha	-	
	TRIFLURALIN 400 EC	1.5 to 2.75 L/ha	-	
Preplant Incorporated to annual grasses	DUAL II	2.0 to 2.75 L/ha	-	Preplant incorporate to a depth of 10 cm. Use only on transplanted tomatoes, grown for processing.
	DUAL II MAGNUM	1.25 to 1.75 L/ha	-	
Preplant Incorporated Germinating annual grasses and broadleaf weeds	DUAL II plus SENCOR 500 F	2.0 to 2.75 L/ha 0.5 to 1.4 L/ha	-	Apply to transplanted tomatoes only. Damage may occur if transplants are weak.
PPI followed by Postemergence	METRIBUZIN: SENCOR 500 F	Rates vary according to treatment and formulation	-	Processing tomatoes only. SENCOR can be used in several ways: (i) 0.5 to 1.4 L/ha SENCOR 500 F or 0.33 to 0.9 kg/ha SENCOR 75 DF/LEXONE 75 DF can be tank mixed and incorporated with TREFLAN; (ii) or 0.6 to 1.7 L/ha SENCOR 500 F, or 0.32 to 1.1 kg/ha SENCOR 75 DF/ LEXONE 75 DF can be applied as a postemergence spray directed to the bottom one-third of tomato plants established at least 3 weeks; (iii) Multiple Application Techniques; apply postemergence before weeds are 4 cm in height. Re-applications can be made as new flushes of weeds emerge. Do not exceed more than four applications per year. SENCOR 500 F 0.3 L/ha and LEXONE 75 DF 0.2 kg/ha. Avoid application during cool, cloudy, wet weather. Use lower rates on sandy soils. Refer to label for control. Emerged annual broadleaf weeds and annual grasses, including triazine resistant species.
	LEXONE 75 DF	"	-	
	SENCOR 75 DF	"	-	

TOMATOES (TRANSPLANTED) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Postemergence Annual Grasses	EXCEL SUPER 80.5	0.67 to 1.5 L/ha	55	Apply to grasses in the 1 to 6 leaf stage.
Emerged annual grasses	FUSILADE II 125 EC	0.6 to 1.0 L/ha	60	For volunteer cereal and barnyard grass control, apply 0.8 L Fusilade per hectare at the 2 to 5 leaf stage. For crabgrass and wild oats, use 1.0 L per hectare at the 2 to 5 leaf stage. Foxtail grasses require 1.0 L per hectare at the 2 to 4 leaf stage.
	POAST 184 EC plus ASSIST oil conc. or MERGE	0.8 to 1.6 L/ha 2 L/ha 1.0 L/ha	60	Apply postemergence to annual grasses in the 1 to 6 leaf stage.
Emerged annual broadleaf weeds (1-4 lf) and grasses (1-3 lf) including triazine resistant weeds	LENTAGRAN 45 WP plus LEXONE 75 DF or SENCOR 75 DF or SENCOR 500 F	1 to 2.0 kg/ha 0.2 to 0.4 kg/ha 0.2 to 0.4 kg/ha 0.3 to 0.6 L/ha	-	Use trifluralin PPI. Then apply Lentagran plus Sencor/Lexone as a directed spray to bottom one third of well established tomato plants. See label. This treatment has not been evaluated under Maritime conditions. Use with caution. Do not use before tomato plants reach the 5 leaf stage.
Emerged quackgrass	FUSILADE II 125 EC	1.0 to 2.0 L/ha	60	Apply at 1 to 2 L/ha at the 3 to 5 leaf stage of actively growing quackgrass. 1 L ha suppresses quackgrass top growth.
	POAST 184 EC plus MERGE or ASSIST	2.7 L/ha 2 L/ha 4 L/ha	60	Apply at 1 to 3 leaf stage of actively growing quackgrass. Apply in 110 to 200 L/ha of water. Use merge at 1% volume/volume of water.
Emerged Annual Weeds Inter-row shielded	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
Insects				
Cutworms (preplant)				See -"Control of Wireworms, White Grubs, Cutworms and Slugs".
Climbing cutworms	SEVIN 85 S	275 g/1000 m row	1	Spray in 25 to 30 cm band over the row. Use at least 225 to 275 L/ha spray.
	SEVIN 80 SP	3.0 kg/ha	1	
	SEVIN XLR 43 SU	333 to 416 ml/ 1000 m row	1	
	SEVIN L 420 SU	360 ml/1000 m row	1	
	LORSBAN 400 EC	2.4 L/ha	50	Apply once, when damage first appears.
	LANNATE 90 SP	270 to 540 g/ha	1	Apply in early morning or late evening.
	LANNATE 215 L	1.25 to 2.25 l/ha	1	

TOMATOES (TRANSPLANTED) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Flea beetles	THIODAN 4 EC	1.5 to 2.75 L/ha	2	Apply when insects first appear. Repeat as necessary. Apply in sufficient water for complete coverage.
	ENDOSULFAN 50 WP	1.1 kg/ha	2	
	THIODAN 50 WP	1.0 to 2.25 kg/ha	2	
	GUTHION 240 EC	2.25 to 3.5 L/ha	2	
	SNIPER 240 EC	2.25 to 3.5 L/ha		
	GUTHION 50 WP	1.1 to 1.75 kg/ha	2	
	SNIPER 50 WP	1.1 to 1.75 kg/ha		
	APM 50 WP	0.85 to 1.1 kg/ha	2	
	CYMBUSH 250 EC	140 mL/ha	3	
	SEVIN XLR PLUS	1.25 L/ha	2	
	SEVIN 85 S	1.25 to 2.75 kg/ha	1	
	SEVIN 80 S	1.5 kg/ha	1	
Tomato fruitworm (corn earworm)	DIPEL WP	1.1 kg/ha	0	Moths lay eggs sporadically from mid July to the end of the season. Spray if necessary.
	THIODAN 4 EC	2.75 L/ha	2	
	ENDOSULFAN 50 W	2.25 kg/ha	2 to 7	
	THIODAN 50 WP	2.25 kg/ha	2	
	GUTHION 50 WP	0.85 to 1.1 kg/ha	2	
	SNIPER 50 WP	0.85 to 1.1 kg/ha		
	APM 50 WP	0.85 to 1.1 kg/ha	2	
	APM 240 EC	1.7 to 2.2 L/ha	2	
	SNIPER 240 EC	1.7 to 2.2 L/ha		
	SEVIN XLR PLUS	2.5 to 5.25 L/ha	2	
	SEVIN 50 W	2.25 to 4.5 kg/ha	1	
	SEVIN 85 S	1.25 to 2.75 kg/ha	1	
	SEVIN 80 S	1.5 to 3.0 kg/ha	1	
	LANNATE 90 SP	270 to 540 g/ha	1	

TOMATOES (TRANSPLANTED) *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Colorado Potato Beetle	ADMIRE 240 FS	1.2 L/ha		Soil treatment at planting.
	DECIS 2.5 EC	200 to 300 mL/ha	3	3 applications per year.
	DECIS 5 EC	100 to 190 mL	3	
	NOVODOR EC	4.0 to 8.0 L/ha	0	B.t. tenebrionis.
Diseases				
Damping off	CAPTAN 50 WP	125 to 225 g /100 m^2	-	Use as a dust treatment to soil or in 50 to 85 L of water per 100 m^2. Work into the upper 8 to 10 cm of soil before planting.
	CAPTAN 80 WP	1.5 kg/1000 L	-	Apply 50 to 85 L per 100 m^2. Work into upper 7.5 to 10 cm of soil before planting.
	MAESTRO 75 DF	1.5 kg/1000 L	-	
Bacterial speck Bacterial spot	MANEB 80 WP	3.25 kg/ha	7	Tank mix FIXED COPPER according to manufacturer's directions with one of these fungicides. This disease is difficult to control once established in a field. Spray early at 7 to 10 day intervals. Pre-mix the two fungicides for 90 minutes prior to use. All products must be tank mixed with fixed copper.
	DITHANE M-22 80 WP	3.25 kg/ha	7	
	DITHANE 75 DG	1.1 to 3.25 kg/ha	7	
	PENNCOZEB 75 DF	1.1 to 3.25 kg/ha	7	
	DITHANE M-45 80 WP	1.75 to 3.25 kg/ha	7	
	MANZATE 200 80 WP	1.75 to 3.25 kg/ha	7	
	MANZATE 200 75 DF	1.75 to 3.25 kg/ha	7	
Anthracnose, Early Blight, Late Blight, *Septoria* leaf spot	BRAVO 500 F	2.4 to 4.0 L/ha	1	Begin spraying in mid July and continue at 7 to 14 day intervals. Use shorter interval under continuously wet weather.
	DITHANE F-45	1.8 to 5.5 L/ha	7	
	DITHANE M-45 80 WP	3.25 kg/ha	7	
	MANZATE 200 80 WP	3.25 kg/ha	7	
	MANZATE 200 75 DF	1.75 to 3.25 kg/ha	7	
	DITHANE 75 DG	1.1 to 3.25 kg/ha	7	
	MANEB 80 WP	3.25 kg/ha	7	
	DITHANE M-22 80 WP	3.25 kg/ha	7	
	DYRENE 50 WP	2.5 to 3.75 kg/ha	3	
	POLYRAM 80 DF	2.25 to 3.25 kg/ha	7	

TURNIPS AND RUTABAGAS

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Weeds				
Preplant Perennial Weeds including quackgrass	ROUNDUP 356 Sn	2.5 to 7.0 L/ha	-	Apply in the fall or spring prior to planting. Annual weed control programs will be necessary to control weeds germinating after planting. For quackgrass control apply to actively growing quackgrass when at least 4 new leaves are present. The low rate (2.5 L/ha) will provide a minimum of one season control, while higher rates (4.75 to 7 L/ha) will provide longer term control. The low rate of Roundup should be applied in 50 to 100 L/ha water. If higher water volumes are used add a suitable surfactant. Wait 72 hours before plowing under. Best control of quackgrass is obtained when these herbicides are applied in the fall.
	TOUCHDOWN 480	2.5 to 7.0 L/ha		
	GLYFOS	2.5 to 7.0 L/ha		
	ROUNDUP TRANSORB	2.5 to 7.0 L/ha		
Preplant Incorporated Treatments Germinating annual grasses and some broadleaf weeds	TRIFLURALIN:			Incorporate within 8 hours of application following label instructions. Ragweed and mustards are not controlled. Corn or cereal grains may be injured when planted in fields treated with trifluralin the previous year. Treflan should not be applied on sandy or sandy loam soils.
	TREFLAN 480 EC	1.2 to 2.4 L/ha	-	
	RIVAL 60 DF	1.0 to 1.9 kg/ha	-	
	BONANZA 400	2.0 to 2.75 L/ha		
	DUAL II	2.0 to 2.75 L/ha	-	Do not use on very sandy soils or soils high in organic matter. Use only on rutabagas.
	DUAL II MAGNUM	1.25 to 1.75 L/ha		
	DEVRINOL 50 DF	2.2 to 4.4 kg/ha	60	Shepherd's purse and lady's thumb may escape this treatment. Use only on rutabagas.
Preemergence Treatments Annual grasses	DUAL II	2.0 to 2.75 L/ha	-	Preemergence treatments must be made after the crop is planted but prior to emergence of both crop and weeds. After treatment, the soil should be left undisturbed for as long as possible. Use only on rutabagas.
	DUAL II MAGNUM	1.25 to 1.75 L/ha		
Stale Seedbed Technique Annual weeds	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Apply in 300 to 1100 L of water/ha to foliage of the emerged weeds but before the crop has emerged. Use Gramoxone for best control of grasses. Apply Ignite in 110 to 330 L of water/ha.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		
	IGNITE 15 Sn	2.75 to 5.0 L/ha		
Postemergence Treatments	LONTREL 360	0.56 L/ha	83	Apply when ragweed plants are 5 to 10 cm in height. Rutabagas only. Only one application per year.
Grasses	FUSILADE II 125 EC	0.6 to 2.0 L/ha	45	Apply 0.6 L/ha for control for barnyard grass at the 2 to 5 leaf stage, 1.0 L/ha for control of crabgrass at the 2 to 5 leaf stage, 1.0 L/ha for control of foxtail at the 2 to 4 leaf stage, 2.0 L/ha for control of quackgrass at the 3 to 5 leaf stage. Rutabagas only.
Inter-row shielded Annual weeds	GRAMOXONE 200 Sn	2.75 to 5.5 L/ha		Do not spray solution on the crop plant since it could be injured or killed. Use Gramoxone for best control of grasses.
	REGLONE 200 Sn	2.75 to 5.5 L/ha		

TURNIPS AND RUTABAGAS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Insects	**** Use one of A, B or C methods of application**			
Root Maggot **Method A** **Two Insecticide Drench Applications (Use different chemicals for each application)**	GUTHION 240 SC	95 mL/100 m row	35	Make first application over the row after seeding but before plants emerge and the second directly over the plants 3 to 5 days after thinning (3 to 4 weeks after the first application). Apply as a coarse spray in a 10 cm band over the row. Do not remove surface soil during thinning. Do not breathe fumes or handle insecticides with bare hands. Tops of rutabagas or turnips treated with any of these insecticides should not be used for food for man or livestock before the preharvest interval is over.
	SNIPER 240 EC	95 ml/100 m row		
	GUTHION 50 WP	37.5 g/100 m row	35	
	SNIPER 50 WP	37.5 g/100 m row		
	APM 50 WP	35 to 37.5 g/100 m row	35	
	APM 35 WP	53.6 g/100 m row	35	
	LORSBAN 4E	21 mL/100 m row	28	
Root Maggot **Method B** **One Granular Insecticide at Planting**	LORSBAN 15 G	0.6 to 1 kg of product/1000 m row	40	Apply on a 10 cm band on the soil surface just before opening the furrow for seeding and incorporate into soil while seeding. To do this, place the spout for applying the insecticide in front of the shoe which opens the furrow. Opening and closing of furrow gives incorporation. Be sure that the band from which the soil is taken for closing the furrow has the same width as the insecticide band. Apply a second treatment as a drench spray as in Method A.
	THIMET 10 G	385 to 765 g/100 m row		
	THIMET 15 G	255 to 510 g/100 m row		
	COUNTER 15 G	150 g/100 m row		
and **One to Three Drench Applications (Use different chemicals for each application)**	BIRLANE 400 EC	5.5 L/1000 L/ha	40	Will not control wireworms. Do not breathe fumes or handle insecticides with bare hands. Tops of rutabagas or turnips treated with any of these insecticides should not be used for food for man or livestock before the preharvest interval is over.
	GUTHION 240 SC	95 mL/100 m row	35	
	SNIPER 240 EC	95 ml/100 m row		
	GUTHION 50 WP	37.5 g/100 m row	35	
	SNIPER 50 WP	37.5 g/100 m row		
	APM 50 WP	35 to 37.5 g/100 m row	35	
	APM 240 EC	900 to 950 mL/ 1000 m row	35	
	APM 35 W	53.6 g/100 m row	35	
	LORSBAN 4E	21 mL/100 m row	28	-
Root Maggot **Method C** **Granular Insecticide Applied at the Time of Planting**	LORSBAN 15 G	0.6 to 1 kg of prod/1000 m row	40	For treating in ridged rows, apply insecticide below the soil surface. For ground level planting apply insecticide in a 10-15 cm band over the row and cover with about 2.5 cm of soil. Commercial applicators are recommended for applying fertilizer making ridged rows, placing insecticide at proper depth in row, and precision seeding in one operation. Do not breathe fumes or handle insecticides with bare hands. Tops of rutabagas or turnips treated with any of these insecticides should not be used for food for man or livestock within the preharvest interval 100 days for Thimet.
	THIMET 15 G	255 to 510 g/100 m row		
	THIMET 10 G	385 to 765 g/100 m row		
	COUNTER 15 G	150 g/100 m row	-	Apply only at the time of seeding.

TURNIPS AND RUTABAGAS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Wireworms				No chemicals are registered specifically for wireworm control on either rutabagas or turnip. Root maggot treatment with Lorsban, Thimet or Counter may reduce wireworms.
Aphids	MALATHION 500 EC	1.8 L/ha	7	Obtain thorough coverage. Repeat as necessary.
	METASYSTOX-R 240 SC	1.75 to 2.25 L/ha	14	Do not make more than 2 applications per season. Spray only if aphids are so numerous as to cause the wilting of leaves during dry weather.
	DIAZINON 500 EC	1.1 L/ha	14	
	DIAZINON 50 W	1.1 kg/ha	14	
	BASUDIN 50 W	1.1 kg/ha	14	
	CYGON 480 E	700 mL/ha	7	
	LAGON 480 EC	0.7 L/ha	7	
	DIMETHOATE 480 E	0.7 L/ha	7	
Cabbage looper Imported cabbageworm Diamondback moth larvae	DIPEL WP (for loopers only)	0.55 to 1.0 kg/ha	0	Use lower rate early in the season, when on a 5 to 10 day preventative schedule. Use higher rates and more frequent application when insect pressure is severe or when large worms are present. Registered for turnip greens only. Registered for looper control only.
	MALATHION 25 WP (for looper and cabbageworm only)	2.25 to 5.5 kg/ha	7	Obtain thorough coverage. Repeat as necessary. Registered for Imported cabbage worm and Cabbage looper only.
	THIODAN 4 EC (also controls aphids and flea beetles)	2.0 L/ha	45	Apply when insects are a problem. Do not apply more than twice per season. Do not feed treated foliage to livestock, roots may be fed.
	SEVIN 85 WP	1.25 to 2.7 kg/ha	7	
	SEVIN 50 WP	2.25 to 4.5 kg/ha	7 or 14	(7 days to harvest for roots and 14 days for greens)
	SEVIN 80 SP	1.5 to 3.0 L/ha	7	
	SEVIN XLR 43 SU	2.5 to 5.25 L/ha	7	
	SEVIN 420 SU	2.5 to 5.25 L/ha	7	
Cutworms	LORSBAN 4 E	1.2 to 2.4 L/ha	30	

TURNIPS AND RUTABAGAS *Continued*

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Flea beetles (direct seeded rutabagas)	VITAVAX RS FL	22.5 mL product per kg of seed	-	Mix uniformly before using. Do not store treated seed.
	COUNTER 15 G	150 g/100 m row	-	At rates for root maggot will control flea beetles. Planting time only.
	CYMBUSH 250 EC	200 ml/ha	21	
	BASUDIN 50 W	1.1 kg/ha	14	
	DIAZINON 50 W	1.1 kg/ha	14	
	DIAZINON 50 EC	1.1 kg/ha	14	
	SEVIN XLR PLUS	1.25 to 2.5 L/ha	7	
	SEVIN 50 WP	1.1 to 2.5 kg/ha	7 or 14	(7 days to harvest for roots and 14 days for greens)
	SEVIN 85 S	0.675 to 1.75 kg/ha	7	
	SEVIN 80 S	0.75 to 1.5 kg/ha	7	
Diseases				
Black rot	Hot Water	-	-	Contact extension services for methods.
Powdery Mildew (Rutabaga)	MICRO-NIASUL W (Sulfur)	6.8 kg/ha	0	Use in 675 to 1125 L of water per ha depending on the size of the crop. Do not apply more than 5 times per season.
	MICROSCOPIC SULPHUR	6.8 kg/ha	0	
	TOPAS 250 E	400 g/ha	21	Make two applications per season - the first 50 days after planting and again 20 days later. Use 200 L of water per ha.

APPENDIX I
Seed Treatment

All vegetable seeds may be treated with a fungicide such as captan or thiram (check the label for registration) to protect them from seed decay organisms in the soil. In addition to this, bean, corn, pea, cucumber, melon, squash and other larger seeded crops should be treated with diazinon to control seed maggots and lindane to control wireworms. Commercial seed dressings containing these and other chemicals are available. Check labels for registered crops and rates of application. Some vegetable seeds may be hot water treated to kill organisms on and within the seedcoat - cole crops, turnips, rutabagas, tomatoes, peppers and celery. Contact your vegetable extension services office for further details.

APPENDIX II
Damping Off

This common seedling disease is caused by any one of several common soil borne fungi which occur naturally in soils. Damping off is most severe on cucumber, cauliflower, cabbage, tomatoes, peppers and Spanish onions and may appear either before or after emergence of the seedlings. The most common symptoms on emerged seedlings are the collapsing of the stem at the soil line and the falling over of the seedlings. Other forms of damping off include wirestem, infection of the tops of plants, root rot and seed decay. To reduce the chances of loss from damping off, employ the following practices:

1. *Steam Sterilization of greenhouse soil* - (Use clean, sterile media and flats). Maintain a temperature of 82°C for 30 minutes at all depths of the soil. Leaching is usually required to remove nitrates built up during the steaming process of soil or media. *Fumigation of Field Beds* - Fumigants do not destroy all soil-borne pathogens harboured in root and other plant debris. Always follow manufacturer's directions very carefully.
    - i) Control of Fungi, Nematodes, Insects, Weeds and Some Bacteria
        - (a) Basamid
        - (b) Busan 1020
        - (c) Vapam
        - (d) Vorlex Plus
        - (e) Vorlex Plus CP
    - ii) Control of Fungi, Bacteria and Certain Stages of Insects
        - (a) Formaldehyde
    - iii) Control of Nematodes
        - (a) Telone C-17
        - (b) Telone II
        - (c) Vorlex Plus

2. Treat seed with captan or thiram.

3. Provide good ventilation, water in the morning, avoid dense plantings and keep relative humidities as low as possible.

4. If damping off appears, drench flats with an appropriate fungicide (see disease section under each crop for registered materials). If no materials are listed, then use No-Damp 10 ml in 1 L of water. Water plants with this dilute solution.

APPENDIX III
Control of Wireworms, White Grubs, Cutworms and Slugs

Wireworms

There are a number of options that can be used to reduce wireworm populations. It is always preferable to treat wireworms before the crop is planted. There are few crops that can be treated while the crop is being grown.

Crop rotation can be used to reduce wireworm populations, and to maintain the populations at low levels. Crops that are not attractive to wireworms should be grown prior to planting susceptible crops. Alfalfa, buckwheat, and peas have been suggested for this purpose. It is important to maintain pure stands of these crops, and prevent grassy weeds from growing, especially during May and June when eggs are being laid. Fields should be well drained with surface, and if necessary, sub-surface drainage.

Corn may also be grown in the rotation and treated with a soil insecticide.

One must also be aware of disease carry over with certain crops, and this should be considered when deciding on the crop rotation to be used.

Fallowing the field, in the year prior to planting, will also help reduce wireworm numbers. It is important to keep plant growth to a minimum. Tilling the field during early August is also important as the pupal stage is present at this time, and is very susceptible to mechanical damage. One disadvantage of fallowing is that it can increase soil erosion, and loss of organic matter. Long narrow fields should have marginal weeds controlled with a herbicide, if possible, with tilled margins and headlands.

Chemical control can be applied as a seed treatment for many crops. Seed treatments usually contain diazinon and lindane plus a fungicide. Fonfos (Dyfonate®) Tefluthrin (Force®); terbufos (Counter®) and lindane are registered for wireworm control on corn. Fonfos and Phorate (Thimet®) is registered for wireworm on potato. These may also be applied during the fallow year.

Recent research, has shown that wireworms can be greatly reduced by using a trap crop. It was found that control was best in the early spring, when the majority of the wireworms in a field are near the surface of the soil. Also, in fields, properly fallowed the previous fall, most of the wireworms can be lured to a trap cop such as wheat. If the wheat seed is treated with a commercial seed treatment, a high percentage of wireworms will be killed.

1. The field to be planted should be fallowed overwinter to ensure that wireworms would not be distracted to other food sources in the spring.

2. The treated wheat crop (i.e., seed coated with insecticide) would be planted into fallow ground at least 10 days before the desired crop is to be planted. The wheat is drilled in strips approximately 20 cm. apart and sown at a rate of at least 4 seeds per inch.

3. The wheat can be destroyed before planting, or if practical, the crop may be planted between the rows, and the wheat tilled under at a later date. Alternatively the wheat can be killed with a herbicide where products registered for that crop are available.

White Grubs

White grubs are the larvae of the large, dark brown June Beetles. The grubs will grow for three years, feeding on roots before completing their life cycle. White grubs may be a problem in fields recently turned from sod. They may be controlled in the same way as wireworms.

Cutworms

Cutworms are pests in many of the agricultural areas of the Atlantic Provinces. Most of the damage is to newly set plants in the field but they are often found attacking seedlings in plant beds and greenhouses. They can attack older plants in the field under certain conditions and may be difficult to control.

In greenhouses and plant beds, the small leaves are attacked. In fields, plants are usually cut off just above the ground level, making replanting necessary. Some species, however climb and feed on the lower leaves of the plant. The greatest period of cutworm injury is generally over by early July.

Cultural Control
Prepare fields in the spring as early as possible and kill all weeds and grasses so as to leave fields bare and free of any green growth. Preferably, fields should be bare for two weeks before planting.

Chemical Control
Variegated cutworms may be controlled on certain vegetable crops using Dylox 80 SP, 0.7 to 1.4 kg per hectare in sufficient water for complete coverage.

Climbing cutworms may be controlled using an over the row spray of Sevin 80 SP, 1.5 to 3.0 kg per hectare or Sevin 50 WP, 4.5 kg per hectare. The spray should be applied in a 30 cm band over the row using at least 250 liters of water per hectare.

Darksided and black cutworms may be controlled using Lorsban 400 EC, 2.8 to 5.6 liters per hectare in a broadcast soil spray. Spray over the crop to give thorough coverage. Do not work into the soil. Check the label for days-to-harvest on the specific crops.

Slugs

Slugs can be a pest of a wide variety of vegetable crops. Plants are damaged by the destruction of seedlings, removal of leaf tissue, or by the contamination of the marketable portion of the crop with slime, excrement, or the slug itself. Plants damaged by slugs are also susceptible to attack from rot organisms. Darkness, an increase in relative humidity, and a decrease in temperature will stimulate the slug to emerge from its resting place and begin feeding. The gray garden slug is the most prominent species in Atlantic Area. Slugs can be controlled by cultural practices, barriers, or chemical molluscicides.

Cultural Practices
Fallow, grass sodded fields (also cultivate field margins) for at least one year and install proper soil drainage systems (open ditching and/or tile drains). Fields which are heavy clay, poorly drained and high in organic matter should not be considered for crops which are the most susceptible to slugs. Tillage in the following year should be to a fine tilth which would fully disperse the organic matter and reduce the number of air pockets in the soil (hiding places for slugs). Cultural practices alone will not usually give full control of a serious slug problem.

Barriers
Barriers of hydrated lime, ash, or sand, banded about 2.5 to 10 cm wide by 1.3 cm deep, may keep slugs from entering an area. These barriers lose their effectiveness as they become saturated with water.

Chemical Molluscicides
Products containing metalydehyde, usually mixed with a bait, or methomyl (Brussels sprouts only) as an active ingredient are registered for use against slugs. Check product label for specific crops, species of slug controlled, application rates, and safety practices. Heavy rain and prolonged exposure to climatic conditions reduces the effectiveness of the baits. (Problems must be treated early before crop plants become large).

APPENDIX IV

Weed Control Table For Herbicides Used on Vegetable Crops

CONTROL RATING (see below)[1] E - Excellent G - Good F - Fair P - Poor	ANNUAL GRASSY WEEDS				ANNUAL BROADLEAF WEEDS														PERENNIALS		
HERBICIDES[2]	Barnyard grass	Crabgrass	Foxtails		Chickweeds	Corn spurry	Groundsel	Hemp-nettle	Lamb's-Quarter	Low Cudweed	Mustards	Pigweeds	Purslane	Ragweeds	Smartweeds	Wild Buckwheat	Triazine Resistant		Quackgrass	Thistles	Horsetail
SELECTIVE																					
Afesin	F	P	F		G	G	G	G	G	G	G	G	G	G	G	G	G		P	P	P
Alanap	P	F	F		E	G	F	G	G	F	F	F	F	P	G	P			P	P	P
Atrazine	G	P	F		E	E	E*	G	G	E*	E	E	E	E	E	E	P		G	P	P
Basagran/Basagran Forte	P	P	P		G*	G*	G*	P	F	G	E	F	-	E	E	F	E		P	G	P
Bladex	F	E	E		E	E	E*	G	E	E	E	F	E*	E	G	G	P		P	P	
Buctril M	P	P	P		P	P	-	F	E	-	E	G	-	E	E	E	E		P	F	F
CIPC	E	E	E		E	G*	P	G	F	P*	P	G	G	P	E	E			P	P	P
2,4-D amine	P	P	P		P	P	F	P	E	G	E	E	F	E	F	P	G		P	F	P
Dacthal	F	G	G		F	G*	P		G	P*	P	F	G	P	P	P			P	P	P
Devrinol	G	G	G		G	-	G	-	G	P	P	G	G	F	P	F	P		P	P	-
Dinoseb	P	P	P		E	E	E*	G	E	E	E	E	E	E	G	G	G		P	P	P
Dual II Magnum	E	E	E		P	P	-	F	P	-	P	P	F	P	P	P	P		P	P	P
Edge	E	E	E		-	-	-	G	G	-	P	G	-	P	-	-	G		P	P	P
Eptam, Eradicane	E	E	E		G	G	P*	P*	G	P*	P	F	G	F	F	P	F		P	P	F
Excel	E	E	E		P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P
Excel Super	E	E	E		P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P
Frontier	E	E	E		P	P	-	P	F	P	P	G	P	F	P	P	P		P	P	P
Fusilade	E	E	G		P	P	P	P	F	P	P	P	P	P	P	P	P		G	P	P
Gesagard	P	F	F		G	G	F	G	G	G*	G	G	G	F	G	G	P		P	P	P
Goal	-	-	-		E	E	E	E	G	-	G	G	G	F	E	P	E				
Herbicidal Oil	-	-	-		E	G	P	F	G	-	G	G	G	P	F	-			P	P	P
Hoe-grass	E	E	E		P	P	P	P	P	P	P	P	P	P	P	P	P		P	P	P
Karmex	E	E	E		E	E	G*	G	E	G*	G	G	G	G	G	G	G		P	P	P
Laddok	G	P	F		G*	E	G*	G	E	G*	E	-	E	G	E	E	C		P	F	P
Lentagran	-	-	-		-	-	-	-	G	-	-	G	-	-	-	-	G		-	-	-
Lontrel	P	P	P		P	P	G	P	P	-	P	P	-	G	-	-	-		P	E	
Lorox, Afolan	F	F	F		E	E	F	F	E	G*	E	E	E	G	E	E	P-E		P	P	G
Lexone, Sencor	E	E	E		E	E	G	G	E	G	E	G	E	E	E	E	P		P	P	P

Weed Control Table for Herbicides Used on Vegetable Crops

CONTROL RATING (see below)[1] E - Excellent G - Good F - Fair P - Poor	Barnyard grass	Crabgrass	Foxtails		Chickweeds	Corn spurry	Groundsel	Hemp-nettle	Lamb's-Quarter	Low Cudweed	Mustards	Pigweeds	Purslane	Ragweeds	Smartweeds	Wild Buckwheat	Triazine Resistant		Quackgrass	Thistles	Horsetail
MCPA	P	P	P		P	P	F	G	E	G	E	E	F	E	F	P	E		P	F	G
Pardner, Torch	P	P	P		E*	E*	E	G	E	G*	G	G	G	E	E	E	E		P	F	P
Patoran	F	F	F		E	E	F	F	E	G	G	E	E	G	G	G	E		P	P	P
Poast	E	E	E		P	P	P	P	P	P	P	P	P	P	P	P	G		G	P	
Prefar	E	E	E		P	P*	P*	P*	P	P*	P	F	F	F	P	P*	P		P	P	P
Primextra II Magnum	E	E	E		E	E	E	G	E	E*	E	E	E	E	E	E	P		P	P	P
Princep, Simadex	F	F	P		E	E	E	G	E	E	E	G	E	G	E	E	P		P	P	P
Prowl	E	E	E		G	-	-	-	G	-	P	G	-	-	F	F	G		P	-	-
Pursuit	G	-	E		-	G	-	G	G	P	E	E	G	E	E	F	E		P	-	-
Pyramin	P	P	P		F	F	P	G	G	P*	G	G	F	G	G	G	P-E		P	P	P
Sinbar	E	G	E		E	F	P	G	E	E	E	G	-	G	G	G	E		F	F	P
TCA	G	G	G		P	P	P	P	P	P	P	P	P	P	P	P	P		G	P	P
Treflan/Bonanza/ Rival	E	E	E		G	G	P	F	G	P*	P	G	F	P	F	F	F		P	P	P
Tropotox	P	P	P		P	P	-	P	E	-	F	G	G	G	P	P	P		P	F	
Tropotox plus	P	P	P		P	P	-	P	E	-	F	G	G	G	P	P	P		P	F	
NONSELECTIVE																					
Amitrol-T, Cytrol	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C			G	G	P
Gramoxone	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C			P	P	P
Ignite	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C			P	P	P
Reglone	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C			P	P	P
Roundup/Roundup Transorb/Touchdown	C	C	C		C	C	C	C	C	C	C	C	C	C	C	C			E	E	P

Footnotes:

1. This table was compiled using a number of sources. Therefore, the relative level of control across all herbicides and weeds may not be consistent and distinctions between GOOD and EXCELLENT control may not always hold. A rating of GOOD/EXCELLENT implies that if the herbicide is properly applied under favorable conditions, on weeds at the appropriate stage of growth, acceptable control of the species should occur. POOR control indicates that the weed has a high level of tolerance and control is very unlikely. FAIR control implies control may be inconsistent and variable (depending on a number of factors). Asterisks (*) indicate the rating was estimated from information on a related weed or herbicide. **'C' indicates** that annual weeds will be controlled if emerged.

2. Biotypes of many weed species are known to occur that are resistant to the following herbicides: Atrazine, Bladex, Primextra and Princep. They may also show greater tolerance to Lexone and Sencor.

APPENDIX V

Herbicides

TRADE NAMES	OTHER NAMES	CLASSIFICATION[2]	ORAL TOXICITY[3]
Afesin		SU	ST
Afolan	Lorox	SU	ST
Alanap		P	ST
Amitrol	Cytrol	O	ST
Atrazine	Aatrex, etc.	TR	ST
Basagran	Basagran Forte	D	ST
Bladex		TR	ST
Buctril M		N, PH	T
CIPC		C	ST
2, 4-D amine	Many products	PH	T
Dacthal		P	ST
Devrinol		AM	ST
Dinoseb PTK*		O	VT
Dual II	Dual II Magnum	A	ST
Edge		DNA	ST
Eptam	Eradicane	C	ST
Excel		AP	ST
Excel Super		AP	ST
Frontier		CI	ST
Fusilade		AP	ST
Gesagard		TR	ST
Goal		DP	ST
Gramoxone*		BI	T
Herbicidal oil		O	
Hoe-grass		AP	ST
Ignite		PA	ST
Karmex		SU	ST
Laddok		D,TR	ST
Lentagran		PP	ST
Lexone	Sencor	TR	ST
Lontrel		PD	ST
MCPA		PH	ST
Pardner	Torch	N	T
Patoran		SU	ST
Poast		CH	ST
Prefar		O	ST
Primextra Light	Primextra II Magnum	A, TR	ST
Princep	Simadex	TR	ST
Prowl		DNA	ST
Pursuit		IM	ST
Pyramin		PP	ST
Reglone		BI	T
Ro-neet		C	ST
Roundup	Glyfos, Roundup Transorb, Touchdown	O	ST
Sinbar		U	ST
TCA		O	ST
Terraklene		TR,BI	T
Treflan	Bonanza, Rival, Triflurex	DNA	ST
Tropotox		PH	ST
Tropotox plus		PH	ST

[2]A - acetamide
AM - amide
AP - aryloxyphenoxy
BI - bipyridilium
C - thiocarbamate
CH - cyclohexanedione
Cl-chloroacetamide
D - diazine
DNA - dinitroaniline
DP - diphenyl ether
IM - imidazolinone
N - nitrile
O - other
P - phthalic acid
PA-phosphorylated amino acid
PD - pyridinecarboxylic acid
PH - phenoxy
PP - phenylpyridazine
SU - substituted urea
TR - triazine
U-uracil

[3]VT - very toxic; LD_{50} 0 to 50
T - toxic; LD_{50} 50 to 500
ST - slightly toxic; LD_{50} 500 & up

* Extreme care must be taken with Gramoxone, Reglone and Dinoseb. Inhalation or swallowing it can be fatal. There is no specific antidote for Gramoxone. Protective clothing and proper respirators should be used.

APPENDIX V *Continued*
Insecticides

TRADE NAMES	OTHER NAMES	TYPE[1]	CLASSIFICATION[2]	ORAL TOXICITY[3]
Admire		I	CN	T
Azinphos-methyl	Guthion, APM, Sniper	I	OP	VT
Basudin	Diazinon	I	OP	T
Birlane		I	OP	VT
Counter		I	OP	VT
Cygon	Lagon, Dimethoate	I	OP	T
Cymbush	Ripcord	I	SP	T
Decis		I	SP	ST
Diazinon	Basudin	I	OP	T
Dibrom	Naled	I	OP	T
Dipel	Thuricide, Bactospeine	I	B	ST
Dimethoate	Cygon, Lagon	IM	OP	T
Di-syston	Disulfoton	I	OP	VT
Dyfonate		I	OP	VT
Endosulfan	Thiodan	IM	CH	VT
Force		I	SP	ST
Furadan		I	C	VT
Guthion	Azinphos-methyl, APM, Sniper	I	OP	VT
Imidan		I	OP	T
Kelthane		IM	CH	ST
Lagon	Cygon, Dimethoate	I	OP	T
Lannate		I	C	VT
Lindane		I	CH	VT
Lorsban	Pyrifos	IM	OP	T
Malathion		I	OP	ST
Marlate	Methoxychlor	IM	CH	ST
Matador		I	SP	T
Metasystox-R		I	OP	T
Methoxychlor	Marlate	I	CH	ST
Monitor		I	OP	VT
Novodor		I	B	ST
Orthene		I	OP	ST
Phosdrin		IM	OP	VT
Pirimor		I	C	T
Pounce		I	SP	T
Pyrifos	Lorsban	I	OP	T
Rotenone		I	B	T
Sevin	Sevimol	I	C	T
Sevimol	Sevin	I	C	T
Thimet		I	OP	VT
Thiodan	Endosulfan	IM	CH	VT
Thuricide	Dipel	I	B	ST

[1] I - insecticide
M - miticide

[2] SP - synthetic pyrethroid
OP - organo-phosphate
B - biological
CH - chlorinated hydrocarbon
C - carbamate
CN - chloronicotinyl

[3] VT - very toxic; LD_{50} 0 to 50
T - toxic; LD_{50} 50 to 500
ST - slightly toxic; LD_{50} 500 & up

APPENDIX V *Continued*
Fungicides

TRADE NAMES	OTHER NAMES	TYPE[1]	CLASSIFICATION[2]	TOXICITY[3]
Aliette		F	O	ST
Basamid		IFNH	O	T
Benlate		F	B	ST
Botran		F	O	ST
Bravo		F	CH	ST
Busan	Vapam	BIFNH	C	ST
Captan	Orthocide, Maestro	F	CH	ST
Dithane M-45	Manzate 200, Penncozeb	F	C	ST
Dithane DG	Manzate 200 DG	F	C	ST
Dithane F-45		F	C	ST
Dyrene		F	TR	ST
Easout	Senator	F	B	ST
Ferbam		F	C	ST
Fixed Copper	Kocide, Tricop, etc.	BF	IN	ST
Folpan		F	CH	ST
Formaldehyde	Formalin	IFN	O	ST
Quintozene		F	CH	ST
Maneb		F	C	ST
Manzate 200	Dithane M-45, Penncozeb	F	C	ST
Micro-Niasul	Sulfur	F	IN	ST
No-Damp		F	O	ST
Penncozeb	Manzate, Dithane	F	C	ST
Polyram		F	C	ST
Ridomil		F	O	ST
Ronilan		F	S	ST
Rovral		F	O	ST
Senator	Easout	F	B	ST
Sulphur	Kumulus, Micro Niasul	F	IN	ST
Telone II		N	O	T
Telone C-17		BIFNH	O	VT
Thiram		F	C	ST
Topas	propiconazole	F	S	ST
Vapam	Busan	BIFNH	C	ST
Vorlex Plus or CP		BIFNH	O	T
Zineb		F	C	ST

[1] B - bactericide
I - insecticide
F - fungicide
M - miticide
N - nematicide
H - herbicide

[2] B - benzimidazole
CH - chlorinated hydrocarbon
C - carbamate
IN - inorganic
O - others
TR - triazine
S - Sterol inhibitor

[3] VT - very toxic; LD_{50} 0 to 50
T - toxic; LD_{50} 50 to 500
ST - slightly toxic; LD_{50} 500 & up

APPENDIX VI
Fungicides Registered For Use on Vegetables

Asparagus:	**benomyl** (Benlate); **metiram** (Polyram); **zineb** (Zineb).
Bean:	**benomyl** (Benlate); **captan** (Captan, Maestro, Drillbox DL ST*, DCL Dual Purpose ST, Agrox B3 ST, Agrox DL Plus ST, DL Plus ST, DCT Dual ST, Agrox FI ST); **carbathiin** (Vitaflo 280, Vitaflo 220); **copper hydroxide** (Champion, Coppercide, Kocide); **maneb** (Drillbox ST); **thiophanate-methyl** (Easout, Senator, DCT Dual Purpose ST, DCL Dual Purpose ST); **thiram** (Thiram, Vitaflo 280 ST, Vitaflo 220 ST); **tribasic copper sulphate** (Basicop,Copper 53).
Bean (Dry):	**benomyl** (Benlate); **captan** (Captan ST); **carbathiin** (Vitaflo 280 ST); **dicloran** (Botran); **iprodione** (Rovral); **metalaxyl** (Apron ST); **thiophanate-methyl** (Senator): **vinclozolin** (Ronilan).
Bean (Snap):	**benomyl** (Benlate); **carbathiin** (Vitaflo 280 ST); **dicloran** (Botran); **iprodione** (Rovral); **metalaxyl** (Ridomil, Apron ST); **thiram** (Vitaflo 280 ST); **vinclozolin** (Ronilan); **zineb** (Zineb).
Beet:	**captan** (Captan ST); **thiram** (Thiram ST); **tribasic copper sulphate** (Basicop, Copper 53).
Broccoli:	**captan** (Captan); **carbathiin** (Cloak ST, Vitavax ST); **chlorothalonil** (Bravo); **quintozene** (Quintozene, Terrachlor); **streptomyc** (Streptomycin ST); **thiram** (Clock ST, Thiram ST, Vitavax ST); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Zineb).
Brussels Sprouts:	**captan** (Captan); **carbathiin** (Cloak ST, Vitavax ST); **chlorothalonil** (Bravo); **quintozene** (Quintozene, Terrachlor); **streptomycin** (Streptomycin ST); **thiram** (Clock ST, Thiram ST, Vitavax ST); **zineb** (Zineb).
Cabbage:	**captan** (Captan); **carbathiin** (Cloak ST, Vitavax ST); **chlorothalonil** (Bravo); **iprodione** (Rovral); quintozene (Quintozene, Terrachlor); **streptomycin** (Streptomycin ST); **thiram** (Clock ST, Thiram ST, Vitavax ST); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Zineb).
Cauliflower:	**captan** (Captan); **carbathiin** (Cloak ST, Vitavax ST); **chlorothalonil** (Bravo); **iprodione** (Rovral); quintozene (Quintozene, Terrachlor); **streptomycin** (Streptomycin ST); **thiram** (Clock ST, Thiram ST, Vitavax ST); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Zineb).
Corn:	**captan** (Captan ST, DCT Dual Purpose ST); **chlorothalonil** (Bravo); **fludioxonil** (Maxim ST); **metalaxyl** (Apron ST); **propiconazole** (Propiconazole, Topas); **thiophanate-methyl** (DCT Dual Purpose ST)
Carrot:	**benomyl** (Benlate); **captan** (Captan); **chlorothalonil** (Bravo); **mancozeb** (Dithane, Manzate, Penncozeb); **maneb** (Dithane, Maneb); **metalaxyl** (Ridomil); **metiram** (Polyram); **thiram** (Thiram ST); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Zineb).
Celery:	**anilazine** (Dyrene); **captan** (Captan, Maestro); **chlorothalonil** (Bravo); **copper oxychloride** (Copper Oxychloride, Fixed Copper); **mancozeb** (Dithane, Manzate, Penncozeb); **maneb** (Dithane, Maneb); **metiram** (Polyram); **thiram** (Thiram); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Dithane, Zineb).
Cucumber:	**anilazine** (Dyrene); **benomyl** (Benlate); **captan** (Captan, Maestro); **chlorothalonil** (Bravo); **copper hydroxide** (Champion, Coppercide, Kocide); **copper oxychloride** (Copper Oxychloride, Fixed Copper); **folpet** (Folpan); **mancozeb** (Dithane, Manzate, Penncozeb); **maneb** (Dithane, Maneb); **metalaxyl** (Ridomil); **metiram** (Polyram); **thiram** (Thiram); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Dithane, Zineb); **ziram** (Ziram).
Eggplant:	**captan** (Captan, Maestro); **tribasic copper sulphate** (Basicop); **thiram** (Thiram ST); **zineb** (Zineb).

APPENDIX VI *Fungicides Continued*

Endive:	**maneb** (Maneb).
Garlic:	**anilazine** (Dyrene); **dicloran** (Botran); **iprodione** (Rovral).
Ginseng:	**anilazine** (Dyrene); **chlorothalonil** (Bravo); **fosetyl-al (Aliette); iprodione** (Rovral); **mancozeb** (Dithane, Penncozeb); **metalaxyl** (Ridomil).
Leeks:	**anilazine** (Dyrene).
Lettuce:	**iprodione** (Rovral); **dicloran** (Botran); **ferbam** (Ferbam); **maneb** (Maneb); **metalaxyl** (Ridomil); **thiram** (Thiram ST); **vinclozolin** (Ronilan); **zineb** (Zineb).
Onions:	**anilazine** (Dyrene); **captan** (Agrox ST,Captan ST); **carbathiin** (Progro ST); **chlorothalonil** (Bravo); **copper oxychloride** (Copper Oxychloride, Fixed Copper); **dicloran** (Botran); **formaldehyde** (Formaldehyde ST); **fosetyl-al** (Aliette); **iprodione** (Rovral); **maneb** (Dithane,Maneb); **mancozeb** (Dithane, Manzate, Penncozeb); **metalaxyl** (Ridomil); **thiram** (Thiram ST); **zineb** (Dithane, Zineb).
Parsnip:	**chlorothalonil** (Bravo).
Peas:	**captan** (Captan, Maestro, Drillbox DL ST, DCL Dual Purpose ST, Agrox B3 ST, Agrox DL Plus ST, Agrox IF ST); **metalaxyl** (Apron ST); **maneb** (Drillbox ST); **sulphur** (Kumulus, Micro-Niasol); **thiophanate-methyl** (DCL Dual Purpose ST) ; **thiram** (Apron ST).
Peppers:	**captan** (Captan, Maestro); **copper hydroxide** (Champion, Coppercide, Kocide); **tribasic copper sulphate** (Basicop, Copper 53); **thiram** (Thiram ST); **zineb** (Zineb).
Pumpkin & Squash:	**anilazine** (Dyrene); **benomyl** (Benlate); **captan** (Captan); **chlorothalonil** (Bravo); **copper oxychloride** (Copper Oxychloride, Fixed Copper); **folpet** (Folpan); **mancozeb** (Dithane, Manzate, Penncozeb); **maneb** (Maneb); **thiram** (Thiram ST); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Zineb); **ziram** (Ziram).
Radish:	**captan** (Agrox IF ST); **thiram** (Thiram ST).
Rhubarb:	**captan** (Captan, Maestro, Orthocide).
Rutabaga:	**captan** (Captan, Maestro); **carbathiin** (Cloak ST, Vitavax ST); **propiconazole** (Propiconazole, Topas); **streptomycin** (Streptomycin ST); **sulphur** (Microscopic, Micro-Niasul); **thiram** (Cloak ST, Vitavax).
Spinach:	**captan** (Captan ST); **thiram** (Thiram ST); **tribasic copper sulphate** (Basicop, Copper 53).
Swiss Chard:	**captan** (Captan ST).
Tomatoes:	**anilazine** (Dyrene); **captan** (Captan, Maestro); **chlorothalonil** (Bravo); **copper hydroxide** (Champion, Coppercide, Kocide); **copper oxychloride** (Copper Oxychloride, Fixed Copper); **folpet** (Folpan); **mancozeb** (Dithane, Manzate, Penncozeb); **maneb** (Dithane, Maneb); **metiram** (Polyram); **thiram** (Thiram ST); **tribasic copper sulphate** (Basicop, Copper 53); **zineb** (Dithane, Zineb); **ziram** (Ziram).
Turnip:	**captan** (Captan); **thiram** (Thiram ST).

* ST = Seed Treatment

APPENDIX VII
Insecticides Registered for Use on Vegetables

Asparagus: **carbaryl** (Sevin, Sevimol); **cypermethrin** (Cymbush); **deltamethrin** (Decis); **dimethoate** (Cygon, Dimethoate, Lagon, System); **disulfoton** (Di-Syston); **malathion** (Cythion, Malathion); **methoxychlor** (Marlate, Methoxychlor, Methoxychlor-Plus); **oxydemeton-methyl** (Metasystox-R); **pirimicarb** (Pirimor).

Bean: **azinphos-methyl** (APM, Azinphos-M, Guthion, Sniper); **carbaryl** (Sevin, Sevimol); **diazinon** (Basudin, Diazinon, Diazol); **dicofol** (Kelthane); **dimethoate** (Cygon, Dimethoate, Lagon); **disulfoton** (Di-Syston); **endosulfan** (Thiodan); **malathion** (Cythion, Malathion); **methoxychlor** (Methoxychlor, Methoxychlor-Plus, Marlate); **naled** (Dibrom); **parathion** (Aqua-Parathion); **phorate** (Thimet); **trichlorfon** (Dylox).

Bean (Dry): **azinphos-methyl** (APM, Azinphos Methyl, Guthion Solupak, Sniper); **diazinon** (Diazol); **dimethoate** (Dimethoate Plus); **disulfoton** (Di-Syston); **naled** (Dibrom); **parathion** (Aqua-parathion); **trichlorfon** (Trichlorfon).

Bean (Snap): **azinphos-methyl** (Azinphos Methyl, APM, Guthion, Sniper); **carbaryl** (Sevin); **diazinon** (Diazinon); **dimethoate** (Dimethoate Plus); **disulfoton** (Di-Syston); **methomyl** (Lannate); **parathion** (Aqua-Parathion, Parathion).

Beet: **carbaryl** (Sevin, Sevimol); **diazinon** (Basudin, Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Dimethoate Plus, Lagon, Sys-Tem); **malathion** (Cythion, Malathion); **methoxychlor** (Methoxychlor, Methoxychlor Plus); **parathion** (Aqua-Parathion, Parathion); **trichlorfon** (Dylox, Trichlorfon).

Broccoli: **azinphos-methyl** (Azinphos Methyl, APM, Guthion, Sniper); **Bacillus thuringiensis kurstaki** (Dipel, Thuricide); **carbaryl** (Sevin, Sevimol); **chlorfenvinfos** (Birlane); **chlopyrifos** (Lorsban, Pyrinex, Pyrifos); **cyhalothrin-lambda** (Matador); **cypermethrin** (Ripcord); **deltamethrin** (Decis); **diazinon** (Basudin, Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan); **fensulfothion** (Dasanit); **malathion** (Cythion, Malathion); **methamidaphos** (Monitor); **methomyl** (Lannate); **methoxychlor** (Methoxychlor, Marlate); **naled** (Dibrom); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **permethrin** (Pounce).

Brussels Sprouts: **azinphos-methyl** (Azinphos Methyl, APM, Guthion, Sniper); **Bacillus thuringiensis kurstaki** (Dipel, Thuricide); **carbaryl** (Sevin, Sevimol); **chlorfenvinfos** (Birlane); **chlopyrifos** (Lorsban, Pyrinex, Pyrifos); **cyhalothrin-lambda** (Matador); **cypermethrin** (Cymbush, Ripcord); **deltamethrin** (Decis); **diazinon** (Basudin, Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan, Thionex); **fensulfothion** (Dasanit); **malathion** (Cythion, Malathion); **methamidaphos** (Monitor); **methomyl** (Lannate) ; **methoxychlor** (Methoxychlor, Marlate); **naled** (Dibrom); **oxydemeton-methyl**; (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **permethrin** (Pounce); **trichlorfon** (Dylox, Trichlorfon).

Cabbage: **azinphos-methyl** (Azinphos Methyl, APM, Guthion, Sniper); **Bacillus thuringiensis kurstaki** (Dipel, Thuricide); **carbaryl** (Sevin, Sevimol); **chlorfenvinfos** (Birlane); **chlopyrifos** (Lorsban, Pyrinex, Pyrifos); **cyhalothrin-lambda** (Matador); **cypermethrin** (Cymbush, Ripcord); **deltamethrin** (Decis); **diazinon** (Basudin, Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan, Thionex); **fensulfothion** (Dasanit); **malathion** (Cythion, Malathion); **methamidaphos** (Monitor); **methomyl** (Lannate) **methoxychlor** (Methoxychlor, Marlate); **naled** (Dibrom); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **permethrin** (Pounce) **trichlorfon** (Dylox, Trichlorfon).

APPENDIX VII *Insecticides Continued*

Cauliflower: **azinphos-methyl** (Azinphos Methyl, APM, Guthion, Sniper); **Bacillus thuringiensis kurstaki** (Dipel, Thuricide); **carbaryl** (Sevin, Sevimol); **chlorfenvinfos** (Birlane); **chlopyrifos** (Lorsban, Pyrinex, Pyrifos); **cyhalothrin-lambda** (Matador); **cypermethrin** (Cymbush, Ripcord); **deltamethrin** (Decis); **diazinon** (Basudin, Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan,); **fensulfothion** (Dasanit); **malathion** (Cythion, Malathion); **methamidaphos** (Monitor); **methomyl** (Lannate) **methoxychlor** (Methoxychlor, Marlate); **naled** (Dibrom); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **permethrin** (Pounce) **trichlorfon** (Dylox, Trichlorfon).

Carrot: **carbaryl** (Sevin, Sevimol); **chlorpyrifos** (Lorsban, Pyrinex. Pyrifos); **cypermethrin** (Cymbush, Ripcord); **diazinon** (Basudin, Diazinon, Diazol); **malathion** (Cythion, Malathion); **methoxychlor** (Methoxychlor, Marlate); **parathion** (Aqua-Parathion, Parathion); **phosmet** (Imidan); **trichlorfon** (Dylox, Trichlorfon).

Celery: **acephate** (Orthene); **Bacillus thuringiensis kurstaki** (Thuricide-HPC); **carbaryl** (Sevin, Sevimol); **chlorpyrifos** (Lorsban, Pyrinex, Pyrifos); **cypermethrin** (Cymbush); **dimethoate** (Lagon); **endosulfan** (Endosulfan, Thiodan); **lindane** (Lindane); **malathion** (Cythion, Malathion); **naled** (Dibrom); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **phosmet** (Imidan).

Chinese Vegetables: **Bacillus thuringiensis kurstaki** (Dipel); **carbaryl** (Sevin, Sevimol); **chlorpyriphos** (Lorsban, Pyrinex, Pyrifos); **dimethoate** (Lagon).

Corn (Sweet): **carbaryl** (Sevin); **carbofuran** (Furadan); **chlorpyrifos** (Lorsban, Pyrinex, Pyrifos); **cypermethrin** (Cymbush); **endosulfan** (Endosulphan, Thiodan); **fonofos** (Dyfonate); **methomyl** (Lannate); **parathion** (Aqua-Parathion, Parathion); **permethrin** (Pounce); **phorate** (Thimet,); **pirimicarb** (Pirimor); **tefluthrin** (Force); **terbufos** (Counter, Cygard); **trichlorfon** (Dylox, Trichlorfon).

Cucumber: **azinphos-methyl** (APM, Azinphos Methyl, Guthion, Sniper); **carbaryl** (Sevin, Sevimol); **chlorpyrifos** (Lorsban, Pyrifos, Pyrinex); **diazinon** (Basudin, Diazinon); **dicofol** (Kelthane); **endosulfan** (Endosulfan, Thiodan); **malathion** (Cythion, Malathion); **methoxychlor** (Marlate, Methoxychlor); **naled** (Dibrom); **oxydemeton-methyl** (Meatasystox-R).

Garlic: **chlorpyrifos** (Lorsban, Pyrinex); **cyhalothrin-lambda** (Matador); **malathion** (Cythion, Malathion).

Leeks: **malathion** (Cythion, Malathion).

Lettuce: **acephate** (Orthene); **Bacillus thuringiensis kurstaki** (Dipel, Thuricide-HPC); **carbaryl** (Sevin, Sevimol); **cypermethrin** (Cymbush, Ripcord); **diazinon** (Basudin, Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan); **malathion** (Cythion, Malathion); **methamidaphos** (Monitor); **methomyl** (Lannate); **methoxychlor** (Marlate, Methoxychlor); **naled** (Dibrom); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **phorate** (Thimet), **pirimicarb** (Pirimor); **trichlorfon** (Dylox, Trichlorfon).

Onions: **chlorpyrifos** (Lorsban, Pyrifos, Pyrinex); **cypermethrin** (Cymbush, Ripcord); **deltamethrin** (Decis); **diazinon** (Basudin, Diazinon, Diazol); **fensulfothion** (Dasanit); **fonofos** (Dyfonate); **malathion** (Cythion, Malathion); **methoxychlor** (Marlate, Methoxychlor); **naled** (Dibrom); **parathion** (Aqua-Parathion, Parathion).

Parsnip: **carbaryl** (Sevin, Sevimol); **diazinon** (Basudin, Diazinon, Diazol); **malathion** (Cythion, Malathion).

APPENDIX VII *Insecticides Continued*

Peas: **carbaryl** (Sevin); **diazinon** (Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **endosulfan** (Endosulfan, Thiodan); **malathion** (Cythion, Malathion); **methomyl** (Lannate); **methoxychlor** (Marlate, Methoxychlor); **naled** (Dibrom); **parathion** (Aqua-Parathion, Parathion); **pirimicarb** (Pirimor).

Peppers: **carbaryl** (Sevin, Sevimol); **chlorpyrifos** (Lorsban, Pyrifos, Pyrinex); **deltamethrin** (Decis); **diazinon** (Basudin, Diazinon, Diazol); **dicofol** (Kelthane); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan); **malathion** (Cythion, Malathion); **methoxychlor** (Marlate, Methoxychlor); **oxydemeton-methyl** (Metasystox-R); **pirimicarb** (Pirimor); **trichlorfon** (Dylox, Trichlorfon).

Pumpkin & Squash: **azinphos-methyl** (Azinphos-M, Guthion, Sniper)*; **carbaryl** (Sevin); **diazinon** (Basudin, Diazinon, Diazol)**; **malathion** (Malathion); **methoxychlor** (Marlate, Methoxychlor); **oxydemeton-methyl** (Metasystox-R).

* Pumpkin only. ** Squash only.

Radish: **carbaryl** (Sevin, Sevimol); **chlorpyrifos** (Lorsban); **diazinon** (Basudin, Diazinon, Diazol); **malathion** (Cythion, Malathion); **methoxychlor** (Marlate, Methoxychlor); **oxydemeton-methyl** (Metasystox-R).

Rhubarb: **None Registered.**

Spinach: **azinphos-methyl** (APM, Azinphos Methyl, Azinphos-M, Guthion, Sniper); **Bacillus thuringiensis kurstakii** (Dipel, Thuricided-HPC); **carbaryl** (Sevin, Sevimol); **diazinon** (Basudin Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, Sys-Tem); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan); **malathion** (Cythion, Malathion); **methoxychlor** (Marlate, Methoxychlor); **naled**(Dibrom); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-parathion, Parathion); **trichlorfon** (Dylox, Trichlorfon).

Tomatoes: **acephate** (Orthene); **azinphos-methyl** (Azinphos Methyl, Guthion, Sniper); **Bacillus thuringiensis kurstaki** (Dipel, Thuricide HPC); **Bacillus thuringiensis tenebrionis** (Novodor, Trident); **carbaryl** (Sevin, Sevimol); **chlorpyrifos** (Lorsban, Pyrifos, Pyrinex); **cypermethrin** (Cymbush); **deltamethrin** (Decis); **diazinon** (Basudin, Diazinon, Diazol); **dicofol** (Kelthane); **dimethoate** (Cygon, Dimethoate, Lagon); **disulfoton** (Di-Syston); **endosulfan** (Endosulfan, Thiodan); **imidacloprid** (Admire); **malathion** (Cythion, Malathion); **methomyl** (Lannate); **methoxychlor** (Marlate, Methoxychlor); **naled** (Dibrom); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **trichlorfon** (Dylox, Trichlorfon).

Turnip: **azinphos-methyl** (Azinphos Methyl, APM, Guthion, Sniper); **Bacillus thuringiensis kurstaki** (Dipel,); **carbaryl** (Sevin, Sevimol); **chlorfenvinfos** (Birlane); **cypermethrin** (Cymbush); **diazinon** (Basudin, Diazinon, Diazol); **dimethoate** (Cygon, Dimethoate, Lagon, System); **endosulfan** (Endosulfan, Thiodan); **fensulfothion** (Dasanit); **malathion** (Cythion, Malathion) **methoxychlor** (Methoxychlor, Marlate); **oxydemeton-methyl** (Metasystox-R); **parathion** (Aqua-Parathion, Parathion); **trichlorfon** (Dylox, Trichlorfon).

Rutabagas: **azinphos-methyl** (Azinphos Methyl, APM, Guthion, Sniper); **carbaryl** (Sevin, Sevimol); **chlorfenvinfos** (Birlane); **chlopyrifos** (Lorsban, Pyrinex, Pyrifos); **cypermethrin** (Cymbush); **diazinon** (Basudin, Diazinon, Diazol); **endosulfan** (Endosulfan, Thiodan); **fensulfothion** (Dasanit); **malathion** (Cythion, Malathion); **methoxychlor** (Methoxychlor,Marlate); **oxydemeton-methyl** (Metasystox-R); **phorate** (Thimet); **turbufos** (Counter); **trichlorfon** (Dylox, Trichlorfon).

APPENDIX VIII

Spray Adjuvants

A spray adjuvant is defined as a chemical that is added to a spray tank that modifies a spray solution making it wet, spread or stick better. They may include wetting agents, emulsifiers, spreaders, and stickers. Manufacturers normally include a limited amount of these agents when formulating pesticides. However, because of the wide variation in plants, i.e., tissue surfaces (waxy-hairy), growing characteristics and foliage density, additional amounts may be needed in the finished spray. Common household detergents can be used to improve surface wetting on such plants as onions and cole crops. However, they do not have the desirable sticking characteristics and therefore can hasten and actually increase pesticide wash off. Unfortunately, there are few commercial spreader-stickers registered for use in Canada for fungicides and insecticides.

Defoamers are available and do not require registration under the Canadian Pesticide Control Products Act, providing no claim is made that affects the pesticide performance.

Drift control materials are available. Lo-drift has a registration for food crops but not on crops for animal forage or grazing.

There are a number of adjuvants registered for use with various herbicides. These include Super Spred, Frigate, Citowett Plus, Agral 90, XA oil concentrate, Assist, Enhance, Amigo, Merge, LI 700 and Ag-Surf, to name a few. These materials may increase the effectiveness of herbicides for specific registered uses. Read labels carefully and use only as directed.

APPENDIX IX

Vertebrate Pest Control

PEST	PESTICIDE (Formulation)	RATE Product	DAYS TO HARVEST	REMARKS
Deer (in all veg crops)	HINDER	2 to 4 L per 100 L of water applied at the rate of 450 to 950 L/ha	14	Do not apply this pesticide with other additives or pesticides. Re-treatment may be necessary after heavy rainfall. HINDER is non-phytotoxic to plants past the seedling stage. See Guide to Veg Crops pub. #1400 Vertebrate Pest Control.

Birds and some other animals

The following devices are registered for pest control in Canada:

"Phoenix Wailers" are registered in Canada for use in repelling wild birds and many animals. They are manufactured in Nova Scotia by Phoenix Agritech Canada Ltd., Debert Industrial Park. Placement of these devices and timing are critical to success and based on the biology of each pest.

"AV Alarms" are registered in Canada for use in repelling wild birds and some animals.

Electric Fences can be extremely effective against these animals (deer, raccoon, porcupine and woodchucks). See Publication 1400 for more information.

APPENDIX X

Disinfectants

Disease organisms may carry over in greenhouses and storages or on benches, flats, harvest equipment, grading equipment and bins. Properly applied disinfectants can reduce the spread of disease and contamination of food products. Remove dirt or debris and thoroughly clean all surfaces prior to application. Treated surfaces must remain wet for 20 minutes. Application method should insure that liquid contacts all surfaces. Ventilate storage after treatment. Read the label and follow all safety instructions.

Pest	Pesticide (Formulation)	RATE Product	REMARKS
General storage disinfection	N-alkyl dimethyl benzyl ammonium chloride (Ag-Services General Storage Disinfectant)	0.60 L/100 L	Avoid contamination of food and feed, do not mix with soap or detergent. **Corrosive**, eye damage and skin irritation. Avoid breathing mist and prolonged exposure. Ventilate inclosed spaces during treatment. Do not flush into open streams. All surfaces that will contact food must be rinsed with potable water before reuse.
Potato storage and equipment disinfection	didecyl dimethyl ammonium chloride (Bardac 2210, Quatsan 55, Wilbur-Ellis HY-X)	0.67 L/100 L	
Greenhouse walls, walks and boards	formaldehyde solution 37% (UN 2209)	1.0 L/25 L	Applicator requires gas mask and gloves for personal protection. Ventilate greenhouse during application. Avoid breathing mist or prolonged exposure. Keep greenhouse closed for 2 days after treatment then ventilate for 2 days prior to planting.

APPENDIX XI
Pesticide Safety

BE AWARE - Read the label, even the small print, it will tell you what precautions are needed to handle the product. Do not assume you remember from last year - check and make sure. Check label to see when it is safe to re-enter a field after pesticide application.

PROTECTIVE CLOTHING - Wear at least as much as the label calls for. Do not tuck pant cuffs inside your boots; and wear waterproof clothing.

For less toxic pesticides, adequate clothing must be worn to prevent skin contact. Except where product labels indicate otherwise, nitrile gloves are recommended for use where label directions specify the use of chemical resistant gloves for handling crop protection chemicals. Always refer to the product label for specific recommendations. Use goggles and a respirator when mixing any pesticide.

Clean protective clothing after use. Do not wash or store contaminated clothing with family laundry.

PESTICIDE DRIFT - Those applying pesticides should make every effort to minimize or prevent spray drift by: 1) correct calibration and maintenance of spray equipment, 2) correct operation of the equipment, 3) being aware of the toxicity of the pesticide being used, and 4) being aware of the wind and weather conditions.

DISPOSAL OF CONTAINERS - The Crop Protection Institute and provincial governments have sponsored pesticide container recycling programs. These programs have accepted many types of triple rinsed containers. Contact your Department of Agriculture or Environment for more details. Containers can be triple rinsed, covers and labels removed and returned to vendor.

FARM PESTICIDE STORAGE - Contact your agricultural engineer for storage designs for your province.

1) Keep pesticides out of reach of children and pets. All pesticides should be stored in a ventilated, locked shed with a warning sign on the door. Store away from foods, feeds, fertilizers and seeds.
2) Store volatile herbicides separately from other pesticides, fertilizers and seeds.
3) Always store pesticides in their original containers. Keep the containers tightly closed and dry. Avoid freezing of liquid formulations.

SYMPTOMS OF PESTICIDE POISONING - Read the label for poisoning symptoms. If any illness or abnormal condition occurs during or after exposure to pesticides, contact a doctor immediately. Provide your doctor with label information. Growers and employees are encouraged to have Cholinesterase levels checked at the beginning and end of each spray season.

FIRST AID - Call your doctor or Poison Control Centre immediately if there has been a suspected poisoning. The label has detailed first aid information. Give the label information to the doctor.

PESTICIDE INFORMATION AND ENVIRONMENTAL EMERGENCIES

- Pesticide call line, Pest Management Information Service, Health Canada Ottawa, Monday to Friday, 8:00 am to 4:00 pm (Ottawa time) **1-800-267-6315.**

- Provincial Government Departments have Pesticide Safety handbooks, literature and copies of current regulations.

- Environmental Emergencies

  Transport Canada, Marine Administration Branch, Canadian Coast Guard

  - pesticide spills, fish kills, oil spills and chemical spills

  Maritimes - N.S., N.B., P.E.I. 1-800-565-1633
  Newfoundland & Labrador 1-800-563-2444

VEGETABLE EXTENSION SPECIALISTS

Newfoundland & Labrador Department of Forest Resources & Agrifoods
Website: http://www.gov.nf.ca/agric/

Ed Butt
Crop Specialist
PO Box 340
Pasadena, NF A0L 1K0
Tel: 709-686-2702
Fax: 709-686-2491
E-mail: ed.butt@nf.sympatico.ca

Michael Stapleton
Crop Specialist
Prov. Agriculture Building
PO Box 8700, Brookfield Road
St. John's, NF A1B 4J6
Tel: 709-729-6867
Fax: 709-729-2674
E-mail: mstaplet@agric.dffa.gov.nf.ca

Goldie Porter
Pest Management Specialist
Prov. Agriculture Building
PO Box 8700, Brookfield Road
St. John's, NF A1B 4J6
Tel: 709-729-0022
Fax: 709-729-0205
E-mail: gporter@agric.dffa.gov.nf.ca

Nova Scotia Department of Agriculture & Marketing
Website: http://agri.gov.ns.ca/

Rick Delbridge
Plant Pathologist
Kentville Agricultural Centre
Kentville, NS B4N 1J5
Tel: 902-679-6040
Fax: 902-679-6062
Email: rdelbridge@gov.ns.ca

Lorne Crozier
Entomologist
Box 550, Truro, NS B2N 5E3
Tel: 902-893-6548
Fax: 902-893-0244
Email: lcrozier@gov.ns.ca

Charles Thompson
Vegetable Specialist
Kentville Agricultural Centre
Kentville, NS B4N 1J5
Tel: 902-679-6041
Fax: 902-679-6062
Email: cthompson@gov.ns.ca

Gloria Pickett
Acting Weed Extension Specialist
Box 550, Truro, NS B2N 5E3
Tel: 902-893-6554
Fax: 902-893-0244
Email: gpickett@gov.ns.ca

Bev MacPhail
Greenhouse Specialist
Kentville Agricultural Centre
Kentville, NS B4N 1J5
Tel: 902-679-6034
Fax: 902-679-6062
E-mail: bmacphail@gov.ns.ca

New Brunswick Dept. of Agriculture & Rural Development
Website: http://www.gov.nb.ca/agricult

Christopher Maund
Entomologist
Box 6000, Fredericton, NB E3B 5H1
Tel: 506-453-3477
Fax: 506-453-7978
E-mail: cmaund@gov.nb.ca

Andrew Currie
Vegetable Specialist
Box 6000, Fredericton, NB E3B 5H1
Tel: 506-453-3474
Fax: 506-453-7978
E-mail: acurrie@gov.nb.ca

Kelvin Lynch
Plant Pathologist
Box 6000, Fredericton, NB E3B 5H1
Tel: 506-453-3478
Fax: 506-453-7978
E-mail: klynch@gov.nb.ca

Kevin McCully
Weed Control Specialist
Box 6000, Fredericton, NB E3B 5H1
Tel: 506-453-3481
Fax: 506-453-7978
E-mail: kmccully@gov.nb.ca

Margaret Mann
Greenhouse Specialist
Box 6000, Fredericton, NB E3B 5H1
Tel: 506-453-2507
Fax: 506-453-7978
E-mail: mmann@gov.nb.ca

Prince Edward Island Dept. of Agriculture and Forestry
Website: www.gov.pe.ca/af/agweb

Rachael Cheverie
Integrated Pest Management Specialist
Box 1600, Charlottetown
PEI C1A 7N3
Tel: 902-368-6573
Fax: 902-368-5729
E-mail: rmcheverie@gov.pe.ca

Marleen Clark
Plant Disease Diagnostician
Box 306, Kensington
PEI, C0B 1M0
Tel: 902-836-8922
Fax: 902-836-8921
E-mail maclark@gov.pe.ca

Susan MacKinnon
Vegetable Specialist
Box 1600, Charlottetown
PEI, C1A 7N3
Tel: 902-368-5657
Fax: 902-368-5729
E-mail: sdmackinnon@gov.pe.ca

RV-99-2600
ISNB 0-88871-047-X